The Builder.

Vol. LIII. No. 2340. Saturday, December 10, 1887.

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Travels in Tunisia.

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The first characteristic of Tunis, the authors note, is its excessive and pervading whiteness, all the cities in the neighbourhood being white, but Tunis the whitest of all:—"If economical in most things, in whitewash the Arab is extravagant. He applies it without discrimination,—from the mosque to the koubba, from the palace to the hovel. Bricks or mud, marble or stone, iron or lead, all pass under the same brush; inscriptions are choked up, tracery is hidden, and carved capitals of beautiful design are thus made to look like stucco imitations." There was a time when this might nearly have been said of England, and it is on record that London was at one time called "the white city" in consequence of its general white plaster physiognomy, a fact or supposition which was urged on us by a member of a certain Society the other day as a reason for leaving the old plaster on Staple Inn, instead of uncovering the older timber work. It is a curious feature in architectural history, this persistent recurrence of the desire to whitewash everything, developing itself as luxuriantly in the æsthetic taste of the Arab of the nineteenth century as in that of the English churchwarden of the eighteenth; and it is, perhaps, still more singular that those who hold up their hands in horror at the idea of now whitewashing an ancient building will nevertheless regard with reverence the whitewash of a former generation, apparently on the principle that "whatever is, is right." Not that our authors condone the Arab whitewashings, if we understand them rightly, but they note that it renders the cities "beautiful at a distance," and as part of the landscape. The whiteness seen in the general view, however, is much diversified in the interior of Tunis; the labyrinths of streets, the flying arches from house to house across the narrow thoroughfares, the shops with their painted wooden columns, and the wooden doors with quaint devices formed by numberless nail-heads (this latter feature being apparently a kind of charm, or so regarded) relieve to some purpose the otherwise monotonous white surfaces. A curious superstition is mentioned which we have not heard of before, that the constant use of black along with white voussoirs in the arches is a piece of moral symbolism; it is the emblem of sin or imperfection, more especially when one black voussoir is inserted as a keystone where all the rest is white; to build it or leave it all white would be to assume perfection, and leave the construction open to the revenge exercised upon it by the spirit of evil, who has to be propitiated by this form of recognition, provided for with black paint if "constructive polychromy" is wanting. If this be the case, it is a curious instance of the influence of superstition on architectural detail. It would be naturally supposed that the black and white voussoirs were the offspring of a pure desire for picturesque effect; at all events, they seem, whether from association or not, to harmonise remarkably well with the Arab style of building generally.

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These Roman bits built-in form, one might say, the only connexion between the architectural present and the architectural past. Of the latter the Consular report of Colonel Sir Lyon Playfair, for 1886, quoted by the authors, says:—"Great Roman roads radiated from Carthage, and even an immense series of secondary ones can still in many instances be traced by military columns, testifying to the ancient prosperity of the country and to the genius of its occupants, whether Punic or Roman. Every town on the course of these roads had its temples, basilica, palaces, forum, and thermæ, its theatre and amphitheatre. Triumphal arches and city gates are still found in all their classic grandeur, and at every step the traveller meets with Roman farms * of almost monumental grandeur." The mosques of Tunis possess obviously some interest, as indicated by their picturesque gateways, but they are so jealously guarded from the incursions of the unbeliever that the authors can give no report as to their interior merits. One of the mosque entrances, that to the women's mosque at Tunis, is given in a phototype; like some of the other doorways illustrated, it is a curious combination of a reminiscence of the Classic framework combined with Moorish details; there is a built-up pilaster with a surbase and plinth on either side, a capital with a necking, and the survival of the architrave in the form of a flat arch; and within this framework is the horseshoe arch and thin shaft of Moorish architecture, brought here by the Moors when expelled from Spain. Mr. Graham's drawing of this door was published in the *Builder* of January 10, 1885. The entrance to the Kasba at Susa, given in another plate, is also a curious combination of reminiscences of quasi-Classic general form, with corrupt or quasi-Moorish detail; the cornice showing nearly the outline of a Classic

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* Travels in Tunisia; with a Glossary, a Map, a Bibliography, and Fifty Illustrations. By Alexander Graham, F.R.I.B.A., and H. S. Ashbee, F.S.A., F.R.G.S. London: Dulau & Co. 1887.

* Printed "farms" in the book: possibly it should be "forms."

LONDON.—For alterations to No. 26, Chapel-street, Edgware-road, W. Mr. Robert Willey, architect, 66, Ludgate-hill, E.C. :—

Ashby Bros., City	£490	0	0
Rhodes, Hyde Park	373	0	0
Jones, Bros., Ealing (accepted)	360	0	0

NEW SOUTHGATE.—For new skittle alley, repairs, &c., at the Orange Tree public-house, New Southgate, for Messrs. Huggins & Co. Mr. W. West, architect :—

Spencer & Co.	£274	0	0
Horton	270	0	0
Dearing & Son	259	0	0
H. & J. Cocks	240	0	0

OXFORD.—For the erection of a covered swimming-bath, at St. Edward's School, Oxford. Mr. Wm. Hanson, architect, Oxford. Quantities supplied :—

Symm & Co.	£1,497	0	0
Wilkins & Sons	1,332	0	0
J. Honour	1,315	0	0
Wyatt & Son	1,268	5	10
T. H. Kingerlee (accepted)	1,174	0	0

[All of Oxford.]

[Architect's estimate, £1,250.]

PAIGNTON.—For the erection of a shop and dwelling-house on the Gerston Estate, Paignton, for Mr. H. Ching. Mr. S. Woodbridge, jun., 210, High-street, Brentford, architect :—

M. Bridgman, Paignton	£410	0	0
H. Rabbich (accepted)	593	10	0

RATCLIFF.—For alterations and additions to the Working Lad's Institute, Butcher's-row, E., for Mr. E. H. Murray. Mr. Geo. Sherrin, architect :—

J. Chapman	£762	15	6

[No competition.]

STOKE NEWINGTON.—For the erection of a house at Green-lanes, Stoke Newington, for Mr. A. Mears. Mr. John Groom, architect, 1, Broad Street-buildings. Quantities by Mr. M. King :—

Grover & Son	£2,958	0	0
Stimpson & Co.	2,896	0	0
Lawrence & Son	2,879	0	0
Mattock Bros.	2,773	0	0
Jackson & Todd	2,770	0	0
Exton & Burton	2,717	0	0
H. L. Holloway	2,430	0	0

For Stable Buildings at the above House.

Jackson & Todd	839	0	0
Grover & Son	827	0	0
Mattock Bros.	799	0	0
J. Kent	790	0	0
H. L. Holloway	779	0	0

TOTTENHAM.—For erecting an addition to the Ice Factory of the Tottenham Lager Beer Brewery, Tottenham. Mr. C. Dunch, architect :—

J. & J. Greenwood	£336	0	0
Capel	320	0	0
W. Shurmur	297	0	0
J. R. Hunt	262	0	0

TUNBRIDGE WELLS.—For building a new market, Tunbridge Wells. Mr. L. M. Oaley, architect. Quantities supplied by Mr. Thomas Ladds :—

Mansfield & Son	£4,030	0	0
J. Crates	3,650	0	0
Beale & Son	3,398	0	0
W. T. Judd	3,178	10	0
J. Jarvis	3,176	0	0
E. Thurbon	3,155	0	0

By direction of the Market Committee the plans and specification were considerably reduced and again tendered for as under :—

Crates	£1,509	0	0
E. Thurbon	1,462	0	0
Beale & Son	1,387	0	0
W. T. Judd	1,342	10	0
J. Jarvis (accepted)	1,340	0	0

WALWORTH.—For addition to laundry, at 126, Walworth-road, for Messrs. Drysdale Bros. Mr. R. Mc Clymont, architect, Acre-lane, Brixton :—

Sargeant, Hackney	£155	0	0
Tarrant, Walworth	150	0	0
Money Marsland, Chislehurst*	127	0	0
Legg, Brixton	125	0	0

* Accepted.

WANDSWORTH.—For paving the yards at the new casual wards, Garratt-lane, for the Wandsworth and Clapham Union. Mr. T. W. Aldwinckle, architect, 2, East India-avenue, Leadenhall-street, E.C :—

Nowell & Robson	£575	0	0
R. Mayo	475	0	0
W. H. Wheeler	444	0	0
G. Neal	437	0	0
J. Mowlem & Co. (accepted)	411	0	0

WHITBY.—For the completion of a further section of the Whitby Sewerage Improvement Scheme :—

Firth	£1,050	0	0
Charles Winterburn	708	0	0
Wm. Blooman	698	0	0

WOKING.—For the erection of a house at Woking, for Mr. T. Jones. Mr. W. I. Chambers, architect :—

Wm. Butt, Woking	£2,400	0	0
S. Woods, Weybridge	2,267	0	0
Robt. Pink, Milford	2,122	0	0
E. G. Currington, Guildford	2,100	0	0
Martin, Wells, & Co., Aldershot	2,000	0	0
G. Constable, Hampton Wick	1,948	0	0
E. Seaber, Godalming	1,850	0	0
Geo. Shears, Maybury	1,740	0	0
Ingram & Son, Woking	1,715	0	0
A. A. Gale, Woking (accepted)	1,680	0	0

The three lowest tenderers were invited to submit new estimates on reduced plans.

The above does not include grates, chimney-pieces, hardware, or ironmongery.

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A. M. P.—W. H. & Co. (there is plenty of room for discussion, but it must be carried on, in our columns at least, by those who have no commercial interest in the matter).—C. J. V. (no, and we do not expect it ever will).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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Addressed to No. 46, Catherine-street, W.C.

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William Whiteley, Westbourne Grove,
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HOBBS, HART, & CO., Limited.

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(*Signed*) William Whiteley.

Offices and Warehouse: 76, CHEAPSIDE, London; Manufactories, Wharncliffe Works, Arlington-street, London, N.

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The contrast between the modern and the ancient architecture of the neighbourhood is a very marked one. The authors give the following brief general description of the typical Arab town:—

"Low, brick-built, whitewashed houses, consisting generally of one story, with arched doorways more or less pretentious, and barred windows planned externally without any attempt at symmetry, turning their backs, as it were, on narrow, tortuous, ill-paved streets, in which all kinds of ordure and objectionable matter are deposited. In the midst is a mosque of one uniform pattern, differing only in size and extent from that of some other town. On higher ground stands the military Governor's residence, the Kasba, or citadel. The whole is enclosed with a whitewashed rubble wall, crenellated, pierced for musketry, and buttressed at intervals; pretty at a distance, but much less so in close proximity, and quite useless for purposes of defence. Such is the ordinary Tunisian town, almost devoid of architectural pretensions, if we except the Roman shafts of marble or stone that are conspicuous at corners of the streets, the support and mainstay of ill-constructed buildings."

These Roman bits built-in form, one might say, the only connexion between the architectural present and the architectural past. Of the latter the Consular report of Colonel Sir Lyon Playfair, for 1886, quoted by the authors, says:—"Great Roman roads radiated from Carthage, and even an immense series of secondary ones can still in many instances be traced by military columns, testifying to the ancient prosperity of the country and to the genius of its occupants, whether Punic or Roman. Every town on the course of these roads had its temples, basilica, palaces, forum, and thermæ, its theatre and amphitheatre. Triumphal arches and city gates are still found in all their classic grandeur, and at every step the traveller meets with Roman farms * of almost monumental grandeur." The mosques of Tunis possess obviously some interest, as indicated by their picturesque gateways, but they are so jealously guarded from the incursions of the unbeliever that the authors can give no report as to their interior merits. One of the mosque entrances, that to the women's mosque at Tunis, is given in a phototype; like some of the other doorways illustrated, it is a curious combination of a reminiscence of the Classic framework combined with Moorish details; there is a built-up pilaster with a surbase and plinth on either side, a capital with a necking, and the survival of the architrave in the form of a flat arch; and within this framework is the horseshoe arch and thin shaft of Moorish architecture, brought here by the Moors when expelled from Spain. Mr. Graham's drawing of this door was published in the *Builder* of January 10, 1885. The entrance to the Kasba at Susa, given in another plate, is also a curious combination of reminiscences of quasi-Classic general form, with corrupt or quasi-Moorish detail; the cornice showing nearly the outline of a Classic cornice, with a kind of reminiscence of triglyphs below: the circular arch beneath springing from a clumsily-designed pilaster with capital and base, but the arch in sub-orders in the Gothic manner. Several other doorways are illustrated, and they are among the most picturesque illustrations in the book, and full of character and suggestion, both in their general forms and detail.

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* **Travels in Tunisia; with a Glossary, a Map, a Bibliography, and Fifty Illustrations. By Alexander Graham, F.R.I.B.A., and H. S. Ashbee, F.S.A., F.R.G.S. London: Dulau & Co. 1887.**

* **Printed "farms" in the book: possibly it should be "forms."**

Even the larger palatial buildings of the modern period, though pictureseque, are, in most cases, it would appear, of very flimsy construction, or are in a state of semi-ruin, partly owing to the practice of each new Bey building himself a new palace, the old abode of his predecessor being either dismantled or allowed to moulder away as it will. The Bardo, the palace of the last Bey, is, the authors say, so defective in construction that, though it has not been dismantled, in a few years it will be unsafe for occupation. It appears to contain a curious collection of things,—shafts from Carthage, mosaics from Italy, furniture from France, tawdry hangings, glass, and gilding, &c., "an unseemly collection of things good and bad, but mostly bad." The Dar-el-Bey, or town palace, presents internally the same spectacle of a mixture of incongruous objects; but as a building it is, judging from the view given of the interior court, a very charming piece of architecture in a strongly-marked Moorish style, though built only in the beginning of the present century. The arcade is curious in detail, presenting something very like a thin Classical column to begin with, on the capital of which is mounted an oblong block on end, with the surface inlaid in panels, and from this spring the horseshoe arches with their black and white voussoirs. The general effect of the whole is charming, except the mass of bare wall at the top, which sadly wants "treating" in some way. There is some talk, we are told, of converting this palace into a museum, a purpose for which the authors pronounce it to be very well suited, and in which capacity it would supply a want in Tunis.

In strong contrast with these picturesque but mostly perishable buildings of the modern period are the grand remains of the Romans and Carthagenians, who, in an architectural sense, were probably practically Romans, deriving their style from the great city of which Carthage attempted to be the political and commercial rival. The illustrations of these are the real objects of greatest interest in the book. The illustrations are, we presume, from the drawings of Mr. Graham; the authors have not given any direct clue to the distribution of the joint work between them, but these illustrations, reproduced in two tints from water-colour drawings, resemble in manner those of Mr. Graham's in illustration of Roman triumphal arches, which have already appeared in the same method of reproduction in the pages of the *Transactions* of the Institute of Architects. The first of these remains which is given is that of the aqueduct of Carthage, which marches over the plain in the usual magnificent manner so characteristic of the Roman aqueduct. In the portion shown in the view the aqueduct is in only one tier (about 70 ft. high), built in a kind of concrete in sections 3 ft. 8 in. in height; the piers, instead of having any spread at the impost, batter slightly inwards with a set-off like that of a Gothic buttress, only carried all round the pier, and from this spring the arches. The authors note that in another part of its course the aqueduct did present a grand series of super-posed arches rising to the height of 120 ft., where it crossed the Oued Melian, but it was destroyed by a French Government engineer in order to assist in making a new bridge, and because he said the aqueduct obstructed the waterway of the river. This it may have done, no doubt; but nothing short of absolute necessity could have justified such a destruction of the finest portion of one of what are really the greatest remains left by the Romans in their capacity of builders. The most interesting and least known of the Roman monuments described are, perhaps, those of Sbeitla. Here are the cellas and a quantity of the remains of three temples which stood side by side, with the porticos nearly in a line; the colonnades are all overthrown, but, from the interesting view given of the actual state, there seems to be enough remaining to justify the restoration given on the next plate. A triumphal arch here, of which an illustration is given of the actual state, appears to have differed from the usual or most familiar model of Roman triumphal arches in having not merely applied columns on its face but advanced wings on either side of the archway, with columns spread out from the body of the structure and carrying cross lintels, one of which is still protruding from the face of the masonry above the anta, though the column which once sustained its other extremity has disappeared. The buildings, we are told, were constructed with a very hard compact limestone, "quite white when quarried, but acquiring a rich golden hue after long exposure to the sun. The other facing materials were limestone also, but of different shades of colour, from pale rose to deep red, from light grey to dark slate." This latter piece of information is interesting, as it gives a rather new idea as to the use of a constructive polychromy in Roman masonry. The authors do not mention where they got the information as to the first-mentioned limestone "being quite white when quarried"; but we presume the same stone is now to be found and experimented on in the neighbourhood.

The authors have added to their book a very useful bibliography, or list of the works which have been previously written on the neighbourhood of Tunis; and a remarkably long list it is, showing that there is no want of literary information to be had about the country, though we presume that a good deal of this runs in the same tracks and does not take us into the less easily accessible places. They have also added a small map of the neighbourhood, an addition which saves a good deal of trouble to the reader desirous to follow the run of the country described. We may congratulate them on the production of what is a very pleasant and readable book in itself, though its chief value and interest consist in the description of the great Roman remains that were visited, and in the admirably executed and produced illustrations of these and of some of the Moorish buildings. In a practical sense, also, the book will be of use to any who may wish to explore the same line of country, in giving information as to the means (or no-means) of getting about, and the various and apparently not slight difficulties they will have to contend with.

"WHITELEY *v.* BARLEY."

"SECRECY," it has been often said, "is the badge of fraud." If, however, the decision of Mr. Justice Mathew in the case of Whiteley *v.* Barley, delivered in the High Court on the 21st ultimo, be upheld on appeal, it would appear that the fullest publicity given through local journals, and transparent honesty on the part of the officers of local authorities, will not avail to save them from the pains and penalties imposed by the Public Health Act on jobbery and corruption.

We owe no apology to our readers for bringing this, the latest case, to their notice, as it concerns the character and welfare of an honourable profession, which has never yet been adequately remunerated for good service rendered to the public, and is for that reason exposed to manifold temptations.

The action referred to was brought by an informer under the 193rd section of the Public Health Act of 1875, to recover certain penalties from the Surveyor of the Corporation of Ramsgate. Under several contracts made by the Corporation for the improvement and drainage of the town, the Surveyor was instructed by formal resolution of the Works Committee to take out the quantities of the contract work, his fees being calculated at a sum equal to 2½ per cent. on the amount payable by the Corporation under the contracts; and, as is customary in such cases, the amount of these fees was charged in the contractor's accounts, and received by him upon obtaining a certificate from the Surveyor that the works had been completed.

There were contracts also for main drainage works which the defendant Barley was appointed to supervise as engineer by a special resolution of the Council, and for extra services in respect of these contracts he was entitled to receive also a percentage on the cost, together with a sum equal to 1½ per cent. on the amounts certified for taking out the quantities as a necessary part of the preliminary engineering work.

It was proved beyond all question that there was no attempt at concealment in the transaction. All was fair and above board, and, although the fees payable to the Town Surveyor passed through the hands and accounts of the contractors, still there was no ground for saying that they came from any other source than the borough funds, lawfully chargeable under the terms of the contracts with such payment. It was alleged at the trial that the Surveyor was bound to account for them, less his expenses out of pocket, but the jury found that such an arrangement was not in fact made.

After some consideration, and with evident reluctance, the judge held that the Town Surveyor was a party "concerned and interested" in these contracts within the meaning of the statute, and inflicted four several penalties of 50*l*. each, or a sum of 200*l*. in all,—just one year's ordinary salary of the unhappy delinquent, whose honesty and *bona fides* from first to last had never been impugned; and further, in addition to these penalties, he was, in pursuance of the same section, declared incapable of continuing in his office, or holding any employment under the Act.

It may be expedient to strive to make men virtuous by Act of Parliament, and we certainly do not desire to throw blame upon the Legislature for a laudable effort to check the plague of secret "commissions," and put their heel upon the whole tribe of petty pilferers and peculators who are a standing disgrace to local self-government, and the gravest obstacle to its extension and development; but we contend that this practical interpretation of a well-meant clause is a *reductio ad absurdum*.

If sound in law, and we fear that it will be so held, the position of a Town Surveyor, always inadequately paid, may become well-nigh untenable; and it behoves the Surveyors' Institution, or the Association of Municipal Engineers, to bestir themselves to obtain an amendment of the Act without delay. It has been done before when a similar paradox was brought to light, and by following the lines of the amending Act, known as the 48 & 49 Vict., c. 53, there will be no difficulty in amending the statute, so that real offenders will be punished as they deserve, whilst taking the sting of injustice out of a very salutary enactment.

It was the decision of the Court of Appeal in Burgess *v.* Clark, followed by an equally startling interpretation of the Act in Todd *v.* Robinson, some weeks later, which brought about the amendment of the law. In the first case, the Clerk of a Local Authority was held liable and fined in the sum of 50*l*. for letting rooms in his own offices to the Board at a rent payable to himself, this being held to be an unlawful bargain. In the second case, the Clerk of a Sanitary Authority held a few shares in a gas company which had contracted to light the public streets at a price which would leave a small profit to the company. He was held to have an "interest" in such contract, and was also fined 50*l*. under the section.

These and other similar anomalies induced the Legislature to amend the Public Health Act by providing that a formal resolution of the Authority approving the transaction, after seven days' notice of the meeting published in a local newspaper, should render the letting of rooms and lands, or the holding of shares in any public company which had contracted with the Board, no longer unlawful. Moreover, the written consent of the Attorney-General was made necessary in certain cases.

We think that the case now under review

will serve to indicate the necessity of a still further revision, so as to extend the exemption from liability to honest servants, in all transactions and bargains openly made and approved by the employing authorities.

The resolutions of a public body, publicly advertised, ought to put every ratepayer on his guard, and in this wise many meritorious officers will be saved from a public condemnation, which ought to be reserved for a class of "pestilent fellows" who love darkness because their deeds are evil.

NOTES.

MR. SPIERS has sent us a letter and a diagram in reference to our remarks about the sphere in perspective in our notice of his book on architectural drawing, which we are unable to publish this week, as the diagram was sent late and requires an alteration in the scale of the lettering before it can be reproduced. We may say at once, however, that Mr. Spiers did not intend to suggest that a sphere *per se* could, in any position, be seen as distorted, but only that its projection on the plane of the drawing involved distortion under certain circumstances. We thought he could hardly intend the former meaning, but the sentence struck us as not very clear in its expression. Even on this ground, however, we do not think the question, also referred to in Mr. Baggallay's able and practical paper read at the Architectural Association (and printed in another column), is practically quite such a simple one or so easily disposed of as one or two correspondents who have written to us appear to consider it, for reasons which we will give when we print Mr. Spiers's letter and diagram.

THE *New York Herald* has published a statement of the expenditure on the Panama Canal to the 30th of June, 1886, which has been drawn up by Signor Armero, the agent of the Columbian Government. Among the items to which Signor Armero directs special attention are the following, the prices being stated in dollars:—Stables, 600,000; buildings for offices, private residence for manager, country seat for same, grounds, &c., 5,250,000; central hospital at Panama, hospital and ambulance at Colon, sanatorium at Tabago, and the pharmaceutical staff cost, together, 12,760,000; the offices at New York, Paris, and Panama cost 8,400,000; and there is an item of 2,000,000 for the cost of entertaining guests invited to accompany M. de Lesseps to Panama to inspect the canal during a week's sojourn. It will have to be very clearly shown on what evidence Signor Armero gives figures which, as is the case with the above, are not to be found in the yearly statement of accounts furnished by the Directors of the Canal Company. Indeed, it has to be made more clear than is at present the case, in what currency the dollars above stated are calculated, as the value of the American dollar would give a much larger sum than the accounts of the Company show; while, at the same time, the heavy charge of 1,784,000*l*. for preliminary expenses does not appear in the table. The total given by Signor Armero is 154,909,088 dollars. The total expenditure to June, 1886, according to the balance-sheet rendered by M. de Lesseps on June 30th, 1887, was 640,173,195 francs. It is a remarkable thing that among the numerous reporters who have from time to time given accounts of the state and progress of the enterprise, only two, as far as we remember,—namely, Herr Bayeler and Mr. Rodriques,—seem to have taken the necessary precaution of consulting the series of the *Bulletin du Canal Interocéanique* for definite statements as to work done and cash laid out.

THE displacement of the centres of productive industry from their inland homes to places accessible by water still goes on. The great Atlas Works of Messrs. Sharp, Stewart, & Co., of Manchester, are, as we mentioned last week, to be closed, the business being transferred to Glasgow. Had the Manchester Canal experienced less delay in obtaining Parliamentary sanction, it is possible that a movement so disastrous for Lancashire would not have taken place. But our manufacturers cannot afford to wait. The *Staffordshire Advertiser* announces the probable re-introduction into Parliament of the Upper Trent Navigation Scheme, which was thrown out by the landowners' opposition last year. The magnificent waterway of the Trent, neglected as it has long been, is unrivalled in the kingdom for its natural capabilities, and the work necessary for putting Birmingham in direct water connexion with this arterial channel is surprisingly little. It is estimated that goods may be conveyed the 170 miles from Birmingham to the Estuary of the Trent for 8s. per ton, or about half of the lowest rate practicable by railway. As compared with existing charges, of course, the reduction will be much more considerable. The Warwick Canal Company co-operates in the promotion of the new navigation, the opening of which can be hardly less than of vital importance to Birmingham.

THE recently-decided case of Bateman *v.* The Poplar District Board of Works seems to show that some amendment is required of the Metropolis Local Management Act, 1855. The houses on one side of a road at Poplar were drained into a 9-in. drain running under the yards and gardens at the back of the road, and this was connected with a main sewer. The Court of Appeal held that this drain was not a sewer, and so was not the property of the District Board. The question then arose, it being discovered that another drain belonging to different premises had been connected with the first mentioned one without the knowledge of the District Board, whether this circumstance made the first-mentioned drain a sewer? Mr. Justice North held that it did not, because the defendants could not have known of the connexion with reasonable care. Certainly a connexion surreptitiously made could not well alter the position of the Board; but, on the other hand, it seems to us that such a drain as this should be vested in the Local Authority immediately it is made. It is essentially a "trunk" sewer or drain, not appertaining to any individual house, and it falls within the category of general drains, which ought to be under the charge of the local public authority.

IT is reported that Mr. T. J. Steel, of Gracechurch-street, has purchased for the sum of 200,000*l*. the Strand property of Lord Salisbury. The property in question, whereof the sale was mooted rather more than two years ago, comprises Cecil and Salisbury streets, together with part of the ground between Savoy Mansions (now being built) and the Adelphi, lately washed by the Thames, and extends over about 86,000 feet superficial. On this fore-shore stand some stables, &c., and the tenement which until about 25 years ago was known as the "Fox under the Hill." Its signboard remains across what used to be an approach to the halfpenny steamboat pier at the foot of Ivy Bridge-lane. In the account of a fire in Cecil-street on the morning of Sunday, September 5th, 1880, it was announced that the flames broke out in a house which was "once the residence of the Cecil family . . . . and in one of the rooms, which amid all alterations has been preserved intact, Queen Elizabeth when a guest of the Cecil family is said to have slept." That can hardly be the case, inasmuch as by 1695 had been pulled down the two tenements known as "Great Salisbury House" and "Little Salisbury House." These, combined, formed the original Salisbury House, one of the famous Strand palaces, which was built westwards of the garden of Carlisle, since Worcester, House, by Sir Robert Cecil, James I.'s Lord High Treasurer, elevated Baron Cecil in 1603, and advanced Earl of Salisbury the 4th of May, 1605. Queen Elizabeth was present at the house-warming on the 6th of December, 1602. The ground was traversed by the brook Ulebrig, which crossed the Strand beneath the Ivy Bridge. A view of the house may be seen in the Fauntleroy Pennant at the Soane Museum, and in Wilkinson's "Londina Illustrata," after Hollar. William, second Earl, divided his father's house into two, as indicated. He reserved one portion for his own town mansion, Great Salisbury House. The other portion, Little Salisbury House, was rented to persons of quality, and was at one time occupied by William Cavendish, third Earl of Devonshire, husband to Elizabeth, daughter of William, second Earl of Salisbury. This latter house's site was leased out, in 1692, for Salisbury-street, since rebuilt by Payne, the architect, the crescent and flight of steps at the southern end being added when the brothers Adam obtained their Act in 1771 (Geo. III., c. 34) for making encroachments upon the riverside. The western horn of the crescent stands over Ivy Bridge-lane, which is overlooked by the back bay-windows of the street. A further portion of the estate was let on lease, and covered by a range of shops, the Middle Exchange, reaching from the Strand to the bridge, or stairs, at the river's bank. Proving a failure, the Middle Exchange, together with what remained of Great Salisbury House, was demolished in 1695, and their site appropriated for Cecil-street, whereof the eastern side lies within the Precinct of the Savoy, and abuts against Carting-lane, alongside of the Savoy Theatre. It was whilst standing before the door of his patron, the Earl of Devonshire's, house here that Hobbes was seen and cordially recognised, in June, 1660, by Charles II., who was driving along the Strand. At the sign of the Globe, in Cecil-street, lived, until 1715, Partridge, cobbler, astrologer, and almanack-maker, whom Swift pertinaciously killed in 1708. His almanack, *Merlinus Liberatus*, did not die with him. In 1723 were advertised "Dr. Partridge's night-drops, night-pills, &c., sold as before, by his widow at the Blue Ball, in Salisbury-street." In Cecil-street lived Patrick, ninth Baron Gray (1706), and Sir William Dawes, Archbishop of York, during the interval 1721–4: these at the end house on the western side. No. 18, eastern side, was, in 1800, tenanted by Dr. Wollaston, the celebrated chemist and natural philosopher, who invented the reflecting goniometer, discovered palladium and rhodium, and familiarised us with the practical uses of the camera lucida and the blow-pipe.

AT the annual presentation of prizes last week to students attending the Life School of the Royal Scottish Academy, Sir William Fettes Douglas, the President, delivered an interesting lecture on the Beginnings of Art. He inferred from the discoveries of Schliemann amongst the ruins of Troy that, upon the whole, the Greek record was the least broken, and the most steadily consecutive. "Art," he said, "is the truest and most subtle guide when men seek to judge of works of unknown 'provenance,' and it would be well if archæologists and ethnologists would look to it for the assistance they need." From the carvings found in the Dordogne cave, in circumstances and surroundings showing a state of wretched barbarism, he judged that they were the work of "a race who had not been always savages, but who were the degraded outcome of a degraded civilisation,—a civilisation which probably existed before that of Egypt."

IN a recent issue (Oct. 8) we drew attention to a remarkable discovery made by the French excavators at Mantinea,—three marble reliefs representing the contest of Apollo and Marsyas. It will be remembered that the great interest of the reliefs was that, presumably, they once decorated the basis of certain statues made by Praxiteles and described by Pausanias. Since our last notice a good many particulars have come to light. The reliefs have been taken to the Central Museum at Athens, casts are already made, and they are shortly to be published either in the 'Εφήμερις 'Αρχαιολογική, or the *Bulletin Hellénique*. Meantime, we may state that each relief measures c. 1·5, and that the marks of cramp-irons which served to attach the slabs are still visible. The composition is disposed as follows:—In the centre relief, Apollo seated holding his lyre; in front, Marsyas playing on the flute, near him a Scythian; in each of the two remaining slabs three Muses. Unhappily, not only the style of the reliefs, but the form of the cramping-irons used leaves no doubt in the minds of experts that the relief is of much later date than Praxiteles: so we are bound to relinquish that cherished hope. The further interesting question remains, are they the reliefs seen by Pausanias? Pausanias distinctly says (viii., 9, 1) he saw "the Muse and Marsyas playing on the flute" (*ἐπὶ τῷ βάθρῳ Μοῦσα καὶ Μαρσύας αὐλῶν*). It has been proposed to amend the singular into the plural in order to admit the other six Muses. It seems to us perfectly obvious that no such emendation is necessary. Pausanius, in his perfunctory way, glanced at the front of the basis, saw one, and only one, draped figure playing on the lyre, and concluded it was a Muse. He says nothing whatever of Apollo. The Muses have, it is reported, all the air of being copied from statuary types, and are, therefore, not successful in relief composition. The figure of Marsyas is in the, no doubt, typical attitude of the Myron replicas.

THE Greek Archæological Society have laid bare the foundations of the small temple to Roma and Augustus, on the Acropolis. The site is twenty-five mètres to the east of the Parthenon. The building was of white marble, circular, and surrounded by nine Ionic columns. The diameter is seven mètres. The existence of such a temple has been known since the days of Cyriac of Ancona. The priest of Augustus, who, no doubt, presided over this temple, had a special, inscribed seat in the theatre; and there is also a seat inscribed with the joint names of Demos, the Graces, and Roma. From another inscription (C. Corpus, 478) we learn that Roma, as a goddess, had a joint sanctuary with Augustus on the Acropolis. A short account of the excavation appears in the *Berliner Philologische Wochenschrift* for the 3rd inst.

AN invention has been recently patented which promises to be of material service in all cases where the flow of water, gas, or electric fluid has to be varied at stated hours. Constant attendance and supervision are now required for the purpose, and when the variation has to be made late at night, or early in the morning, the expense of watching is an object as well as the risk. The improvements in question have been made by the Right Honourable Major-General Sir J. C. Cowell, K.C.B., an officer of the Royal Engineers. A wheel is driven by clock-work, so as to make one revolution in each cycle of periodic variation required. This wheel bears a horizontal ring or disc, the surface of which is made to rise or fall in proportion to the variation of supply required from time to time. A regulator is raised or lowered by the revolution of this curved surface, which opens or closes the pipe or channel through which the current of fluid passes. The utmost accuracy is thus attainable, both as to the time and the quantity of supply; and the motion of machinery may be stopped, modified, or set going at the exact time required, without the need of any attendant. In cases where machinery is driven by turbines, and where arrest at a late hour, or starting at an early hour is required, the time-regulator will perform the function of an unsleeping engineer. The lowering of a gas supply over a large area, say at one or two o'clock in the morning, may be punctually secured by the same means. Mechanical men will readily recognise the valuable service that may be rendered by the Time-regulator.

FLATTED houses are now becoming common, owing to the high prices of building sites within cities. Where portions of these tenements are owned by different parties, nice questions are apt to arise as to the rights and duties of the respective holders. A strange hitch of this sort has arisen in Edinburgh. The fronts of two contiguous houses in the High-street, which had been discovered to be in a dangerous condition by the Burgh Engineer, were ordered to be taken down. The frontage was seven stories, and the proprietors of the five lower stories have rebuilt their portions, but the owners of the two upmost floors decline to proceed. The roof has been propped up, and there is considerable risk of its being displaced by a high wind. The matter is under the consideration of the Dean of Guild Court. We have heard of instances where a tenement has been taken down and has not been replaced for years owing to misunderstandings between the joint owners, but never of a case like the present. There would appear to have been no arrangement entered into between the owners, as should have been done before building operations were commenced.

THE new premises for the accommodation of the Elder Chair of Naval Architecture and Marine Engineering, Glasgow University, are now completed and occupied. These buildings, which also comprise a principal gateway and janitor's house, are the donation of Sir William Pearce, Bart., M.P. The picturesque and impressive façade of the old College in High-street, with its bold corbelling, has been incorporated in the principal front of the new edifice, the entire stonework having been successfully transported from east to west. The masonry, which is of a very vigorous character, dates back to A.D. 1632-58. The entrance for pedestrians is through the original archway, conspicuous by its massive rusticated quoins and voussoirs, which opens into a handsome arcaded piazza. The ancient sculptured escutcheon bearing the Royal Scottish Arms and the monogram "C. R. 2," a fine old carved shield with the arms of the University, and a tablet relating its foundation by Bishop Turnbull, A.D. 1451, and the curiously-carved window-head and dormers, on which may be recognised the arms of England, Scotland, Ireland, and France, are embodied in the structure. These several features have been grouped with the new work, which is designed in harmony with the mixed Jacobean and French style of the old College. A Latin inscription above the principal entrance records the circumstances of Sir William Pearce's gift. The access to the class-rooms is by a circular stair tower, and the carriage entrance gates are flanked by massive stone turrets, rusticated to match the principal arch, and surmounted by high-pitched conical caps. The malleable iron gates, which are of imposing dimensions, have been designed by the architect in the old Scottish style of ironwork. The entire structure constitutes a stately and interesting entrance to the University precincts,—a link between the present and the past. It may be added that the doorway of the former Fore-hall has been re-erected in its wonted position at the head of the quaint "Lion and Unicorn" staircase in the Professors' Quadrangle, itself a relic of the old college. The architect of these buildings is Mr. Alexr. George Thomson, I.A., Glasgow, who, in October, 1883, advocated in the press the removal and re-erection of the ancient stonework and decorative features as an adjunct to the University in its new site at Gilmour Hill.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE third ordinary meeting of the present session of this Institute was held on Monday last, Mr. Edward I'Anson, F.G.S. (President), in the chair.

Obituary.

Mr. W. H. White (Secretary) announced the death of Mr. Edmund Woodthorpe, Fellow.

The President.—It is not my intention to trouble you with any long speech on the subject of the announcement which has just been made to you. I am quite sure I have only to mention the name of one who was so universally known amongst us, for a more cheery, bright, and honourable man did not exist in the profession. Gentlemen, with these words I will say no more, because you will have in the Proceedings a short paper I have written myself, and I have no doubt also that the professional papers will deal with the subject.

Professor Kerr.—I am glad to be allowed to say a word on this subject. Nothing could be added to the very feeling testimony which you have borne to Mr. Woodthorpe's memory. We all knew him so exceedingly well, both in this room and professionally at large. He was, as you have said, a most honourable man, most genial in his ways, and most useful as a member taking part in our discussions. But there is one thing I must say, if I may be allowed to do so without verging upon indiscretion. We know that Mr. Woodthorpe held two very important offices, and that he and his family must have been largely dependent upon the income derived from those offices. The headship of his family has now devolved upon a most worthy son,—a man of high education, character, and estimation. I think I may say that we hope the authorities will not overlook the claims of the son, as a matter of respect to the father. If it should be, as I think it will be, decided elsewhere, that this will be mentioned to the Metropolitan Board of Works, *quasi* officially, I am quite sure this meeting will authorise the Council, or any representative of the Council, to recommend this gentleman as successor to a father so very much respected as a public officer of the highest standing, and possessed of great wisdom, as I can testify from his management of our affairs in connexion with the District Surveyors' Association. I think, therefore, that it would be a most graceful testimony to the respect in which Mr. Woodthorpe was held, if some favour were shown to his son (applause).

The Institute Examination.

The Secretary next announced that at the Examination lately held, twenty-five candidates were examined, of whom nineteen had passed, and were qualified to become candidates for the Associateship. The following were the successful candidates, viz.:—Messrs. A. T. Bolton, E. J. Brydges, Thomas Davidson, E. H. Dawson, G. A. H. Dixon, J. W. Donald, G. W. Durrell (from Sydney), S. G. Gosse, R. M. Gruggin, Thomas Henry, George Hornblower, L. V. Hunt, W. C. Jones, John Peter, A. B. Pite, G. W. Sadler, jun., H. A. Satchell, A. Sykes, and W. H. Woodroffe. These, with the twenty-five candidates who had passed in March, made altogether forty-four who had been successful this year (applause).

The Secretary further announced that the Ashpitel Prize had been awarded to Mr. Thomas Davidson, aged twenty-three, formerly of Scarborough, and now of London.

Theatre Construction.

Mr. Ralph Nevill, F.S.A., then read a paper entitled "The Auditorium of a Theatre," of which the following is an abstract:—

The author, after a few introductory remarks, dealt with the plan of a theatre and the arrangement of seats. In England, within the last few years, various efforts had been made to meet modern requirements. The drawings which he was able to exhibit by the kindness of Mr. Phipps and Mr. Verity would confirm that statement. Mr. Irving's plan was bad, for the people at the back could only see the lower half of the stage. The system of seating at the Haymarket was the best artistically, and the proportions allotted to the various parts of the audience were commercially most satisfactory; the system was also economical in first cost, and in proportion of cubical space to accommodation. The pit, which should be as large as possible, would, with good accommodation, always prove a financial success. The stalls should be only slightly curved, having no central passage, and the seats should be regularly alternated, so as to afford a clear view between the heads of those in front. The visible openings of boxes should not be more than 5 ft. or 6 ft. high. The gallery should be at the back, and not in the circle. It was important, artistically, as well as for acoustic reasons, that the ceiling of the auditorium should be as low as possible.

Acoustics.—The circular form of building afforded no advantage, the best being a triangle with the stage at the apex, as in the theatre at Baireuth, although seats arranged on a curved plan allowed a greater number to receive unimpeded waves of sound. In a plan by the author, ¼ the diameter was taken for the height from the stage level to the springing of the ceiling; this was lower than most modern theatres, the height of which, apparently, measured as much as the diameter. The lesser height was, however, an artistic and economical, as well as acoustic, gain. Flat ceilings rendered the hearing in the upper part defective; if curved, the sound was collected and delivered in a body on to the upper circle. Ventilation and fire risk were also connected with the ceiling; the introduction of the sunlight rendered it more easy to ventilate through the centre of the roof, and some suggested a cupola, but this he considered impracticable and undesirable. Proposals had been made for reversing the draught by ventilating through the stage, but most architects would agree with Professor Roger Smith that all draught should be from the actor to the audience. Professor Smith quoted, in his treatise on acoustics, some experiments to the effect that though sound travelled better with the wind than against, yet it travelled better still across the wind. If this were true, and the author believed it was, one great objection to the central ventilating flue disappeared. Saunders, Professor Smith, Mr. Salomons, and nearly all English theatrical architects, upheld wood, while Lachez, followed by some of the French architects, demanded solid construction. A house for music required an amount of resonance, while in one for acting sound should be delivered pure and distinct. Wood was, therefore, as bad for the latter as stone or hard walls for other reasons. Plaster was the suitable substance, supplemented by drapery where necessary. Wood might be a suitable lining to solid walls if carefully selected, put together like cabinet work, and well oiled and varnished; but floor boards nailed to wooden joists, or match boards papered or painted, had no beauty of tone, and the consequent vibration interfered with the purity of the sound. In Terry's Theatre no wood was used in this way, but, instead, concrete floors and partitions of plaster on wire netting and iron uprights. The ceiling should be treated as a resonant surface, constructed of iron and plaster, with a second roof over enclosing a sufficient hollow. The spaces under the floor and orchestra should also be hollow. Any resonant substance used should be of homogeneous character.

Lighting.—This ought to be regarded by the manager as a potent means of inspiriting an audience. It might be accepted that the electric light would be used, but, nevertheless, provision must be made for gas. To be successful artistically, the light must be various. In the event of fire the electric light would be extinguished; the gas sunlight ought, therefore, never to be put out, but turned low during the performance, and turned up full between the acts, the electric light being turned quite out in the first case, so that the eye was entirely drawn to the stage. The front of the circles was the natural place for electric lights. Putting them high up in a cupola, and using ground-glass globes for electric lights, was to be strictly condemned; the latter, though much used, destroyed the brilliancy of the light. The lights to the passage and on the stairs should be on a separate system altogether from that of the auditorium or the stage, and should be controlled from the front of the house. To protect against rushes of carbonic gas extinguishing the light, at certain points, such as the entrance to stairs and opposite doors, small flues and openings with thick glass fronts should be provided in the walls for lamps or gas-lights.

Ventilation.—The electric light rendered no great provision of fresh air necessary during a performance. It would, however, be always requisite to provide an exit for impure air;[*] and, as long as gas was used behind the scenes, there must be sufficient ventilation to take away the enormous and dangerous heat at the top, without creating a draught to the stage. The sunburner ought to be in a little cone or drum of its own, and have an outer ring to the shaft, which should be opened by the same action that turned up the light, in order that ventilation might be accelerated between the Acts.

Exits and Entrances, Stairs, &c.—Necessarily the site largely governed both exits and entrances, and the important point was to get plenty of doors leading out of the auditorium. Any part accommodating more than 200 persons should have more than the usual two doors. The pit holding 350, in a plan of his own, possessed four doors and an extra one in the middle. All doors should have the upper panels glazed, should open outwards, and be self-closing, so that, when the audience were out, the doors would be closed to fire. No more dangerous arrangement could be concocted than a long straight staircase. The straight exit from Terry's Theatre had been made a great deal of in the public press, but having passed down it, he would rather take his chance anywhere in the passages of a burning theatre than be one of a crowd going down it. No flight of stairs should be long without at least a small landing that might afford opportunity to resist pressure from behind. The best form of landing-stair was undoubtedly such as that to the gallery at the Prince of Wales's Theatre, in which four flights of four steps each went round a centre. The rounding-off of the corners was a great improvement. The great desideratum in a staircase was that a crowd could pass from top to bottom without any great pressure at any point, and in a continuous stream. A circular staircase would best attain this, the difficulty of the difference in the width of tread being overcome by using an ellipse for the plan, in which the steps were set to a very large radius, and the small ends used as landings. There was another form of the ellipse still more easy, and often applicable to a theatre—that was by forming the ellipse round a triangle. The Metropolitan Board of Works required that every staircase should be solidly closed in on both sides. The author ventured to say that regulation was a dangerous mistake. A staircase in a public building should be open at the sides from top to bottom; there should be no part from which the passengers were unable to see what took place all the way down, and, especially, to see the way out. Mr. Nevill considered it would be of the greatest advantage if all the staircases could be concentrated in one building, and be under one general control and supervision. A design for such a staircase, on the triangular plan, was exhibited; each flight rose 8 ft. 6 in., the height of the floors. A separate staircase started from each corner,—one to the pit circle, one to the upper circle, and one to the gallery. The central space was left open, and the whole building carried up to a good height to allow smoke or gas to escape upward. Iron foot-rests should be built into the stair on the inside, up which firemen could climb if required.

Fire Risks.—At the present moment this was the point of most interest in connexion with theatres, and after deprecating more than a certain degree of legislation and State interference, the author expressed his belief that in London, in a well-regulated theatre, fire risks were of the slightest. The only particular danger in a theatre, above other places, was the reckless use of gas behind the scenes and the extreme combustibility of the woodwork over the stage. Electric light and fireproof paints, together with the careful use of iron and concrete in the structure generally, would minimise the danger. Some form of fireproof curtain must be obtained, and sufficient of the top of the stage should open to form a chimney. It was an advantage to substitute iron in the seats where feasible, to avoid a blaze as much as possible. The seats should be cut off by a fire-resisting partition or wall from the corridors. The opening in the top of the stage should not be too large, and the same action which opened it should open a valve at the bottom for inlet of air. Referring to the fireproof curtain, Mr. Nevill mentioned several, such as hydraulic curtains of two thicknesses of iron, solid oak or teak, asbestos, silicated cotton curtains, and the water curtains of Captain Heath and M. Marius. A very useful addition to a theatre would be a separate door and small iron stair in a fireproof shaft for firemen to enter from the outside.

The reading of the paper not being concluded until a quarter to ten,

Professor Kerr moved the adjournment of the discussion, as the subject was one of too great importance to be dismissed in the quarter of an hour which remained to them that evening.

Mr. Walter Emden said he had been invited to be present with a view to taking part in the discussion, and he was afraid he would not be able to attend at the adjournment.

The President believed the paper would lead to a long discussion, as the subject was one of extreme interest. They had, however, still a quarter of an hour before them, and there was no reason why they should not occupy that time in commencing the discussion, at any rate.

Mr. Walter Emden then said he would be pleased to follow the paper as far as he could; at the same time, there was in it so much of pure theory and assertion, and so much which was opposed to practice, that it would be impossible to go through it in anything like a satisfactory manner. He would, therefore, only take up one or two points, which seemed to him those on which he could more particularly touch. The first was the placing of the pit people in a better position. No manager could afford to make his theatre a "Royal Pit Theatre," by giving the best portion of his house to the frequenters of the pit. Mr. Irving's plan of putting the pit people a long distance back was not advisable, as they would not be able to see, they would be pretty well suffocated by the heat, and a great portion of them would not hear what was going on. At the same time, the ordinary theatre which obtained favour in England, with its pit and stall tier, its dress-circle tier, and its upper-boxes and gallery tier, was the one most suited to the habits of the people. With regard to acoustics and the use of wood, it had now been proved that iron and concrete were equally good conductors of sound, creating a much better and more resonant sound than wood construction. No doubt plaster on wire would act in much the same way, but was it necessary? In the case of Terry's Theatre, the partitions between the boxes were not of plaster, but were of hollow fire-brick. As to staircases, there was no elliptical one which would be helpful in case of a crush, although a crush was sometimes stopped by a square staircase. People often got out better by a straight staircase, but whether the straight or square form was the better was a question that might be debated for ever without any satisfactory conclusion being arrived at. By using an elliptical staircase, he was quite sure no one would be saved. He had had experience of one in his late offices, and everybody stumbled who came up it, as the tendency of the eye to look in a curved direction gave the body a proneness to swing over. What was required was to make the staircase as straight and clear as possible for people coming down, and particularly when in a state of panic. The lecturer had made a mistake in stating that theatres were generally lit by gas or electricity commanded from the side of the stage. That was not so; for, according to the regulations, there must be a separate meter in the front of the building to command the lighting of the house, the only portion of the front of the house commanded from the stage being the sunlight. As to theatres being fireproof, he could absolutely affirm from experience that no theatre had been built, before Terry's, that was really what could be termed fireproof. The circles or tiers were built in the ordinary way, with iron girders and columns, but the intermediate construction between the girders had, up to the present time, been of wood, and, although a small portion of concrete might have been used in the corridors, the tiers which carried the public had been built of wood. There was no doubt that it was a perfectly easy matter to build a fireproof theatre, so far as the auditorium was concerned, and of materials that would not communicate fire. The difficulty and danger was from the stage, and it was that portion of the building which required to be dealt with in the most experienced manner. As the lecturer had not travelled outside the question of the auditorium he himself would stop at the fireproof curtain. An iron curtain would probably buckle under the action of heat more quickly than a wooden one, and in doing so, its immense weight might pull down the proscenium walls and wreck the theatre. What was wanted most was to save the audience by giving them time to get out of the building. In order to do that something was wanted which could be readily at command. An ordinary asbestos sheet curtain on an iron grille could be used in the same manner as an ordinary green curtain, going up and coming down between the acts, and such a curtain, especially if of double thickness, would stand for a sufficient time to allow the house to be emptied. The line of sprinklers over the curtain would keep it cool, and it would probably stand when everything on the

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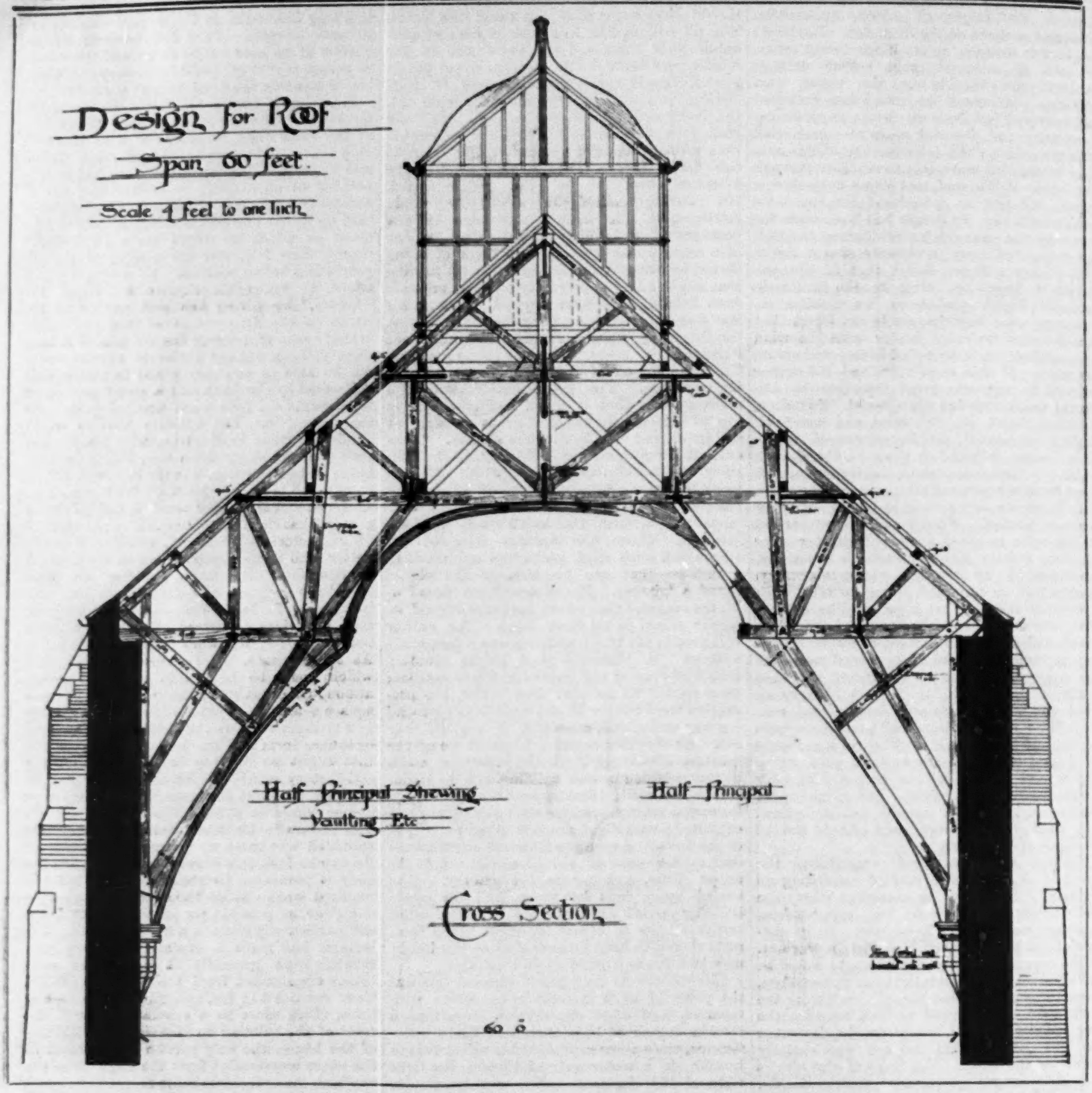
[*] And how is the exit to act, unless there is an inlet of corresponding superficies? Unless this is supplied in a proper place, the requisite exit can only act by drawing in fresh air through places not intended,—doors, &c.; *i.e.*, by creating draughts.—ED.


Design for Roof
Span 60 feet.
Scale 4 feet to one Inch.
Half Principal Shewing Vaulting Etc
Half Principal
Cross Section
60 0

stage was burnt out. Therefore, as long as the curtain stood, the theatre would practically consist of two buildings,—one on fire and the other not. He did not consider sprinklers to be useful when they were automatic, though they were serviceable if placed under the control of valves. A sprinkler with a small spray of water was not intended to extinguish a great fire, but rather to attack the fire in its incipient stage. A pail of water could have saved the Exeter Theatre had it been applied to the part of the border which first took fire. As to the system stated to have been used at Drury Lane in 1812, so far as it went, it was upon much the same system as the modern idea of sprinklers. It consisted of rows of pipes pierced with holes. These might have rusted or otherwise got out of order, and were probably found expensive to deal with, owing to want of pressure, because the water-supply then came from Adelphi-terrace. He believed the arrangement had not fallen into disuse so much because of its ineffectiveness as from want of the necessary pressure, and from the pipes being left unused, and getting out of order. And though the present sprinkler was a very effective and useful appliance, it would be wrong to exaggerate its use; it was simply serviceable in arresting a fire in its incipient stage.

Mr. Alfred Darbyshire said that he had come from Manchester to take part in the discussion. As it had been decided to adjourn it, he would ask to be allowed to send his contribution in the form of a written document, as in all probability he would be unable to attend when the matter came up again.

Mr. Robert Walker seconded Professor Kerr's proposal for the adjournment of the discussion. The paper they had heard contained a great deal that was valuable, and also much that was startling to those who knew anything about theatres and theatre-building. It had fallen to his lot during the last twelve years, as District Surveyor of a central part of London in which fifty per cent. of the largest and principal theatres were situated, to have a great deal to do with them. He had seen many theatres destroyed, and many reconstructed and rebuilt, and, from the experience he had been compelled to gain in active service, he differed from a great deal that Mr. Nevill had advanced. He was therefore prepared, if the discussion were adjourned, to re-open it on its resumption. But he would like in the most emphatic manner, as a practical architect, associated officially with the supervision of a large number of the London theatres, to protest against one expression which had fallen from Mr. Nevill. That gentleman had said that the public were under great obligation to managers for providing theatrical entertainments, and that (though he was not quite sure he had caught the exact words) the question of the number of exits, and the absolute safety of the public in the buildings as regarded the exits, were not altogether subjects for legislation of the most direct character. Now, he must dissent entirely from that view, and believed that it was their business, as professional men, who had to overlook those buildings, to see that there was the minimum of danger attaching to them. And, so far as they could, by legislative enactments, bring their influence to bear, it was their solemn duty to see that such enactments were carried out as necessary for the absolute safety of the public. He would, therefore, warn his hearers, as professional men, that unless they adopted that as a principle of their professional career and practice, the public would sweep them away.

Mr. E. J. Tarver* then proposed a vote of thanks to Mr. Nevill.

Mr. Octavius Hansard seconded the motion, adding that he hoped the members would have copies of the paper *in extenso* before the discussion was resumed.

The resolution, on being put to the meeting, was very cordially received.

Mr. Nevill briefly acknowledged the vote of thanks and begged the members not to go too much upon the abstract of his paper, which was wanting in the great amount of detail he had given in the paper itself.

It was then agreed to adjourn the discussion to the first meeting of the Institute in February next, by which time the members would have the complete paper with the plans accompanying it in their hands.

The President stated that the next meeting would take place on the 19th inst., when the winner of the Edis Prize would be announced, and other important business be transacted.

The proceedings then terminated.

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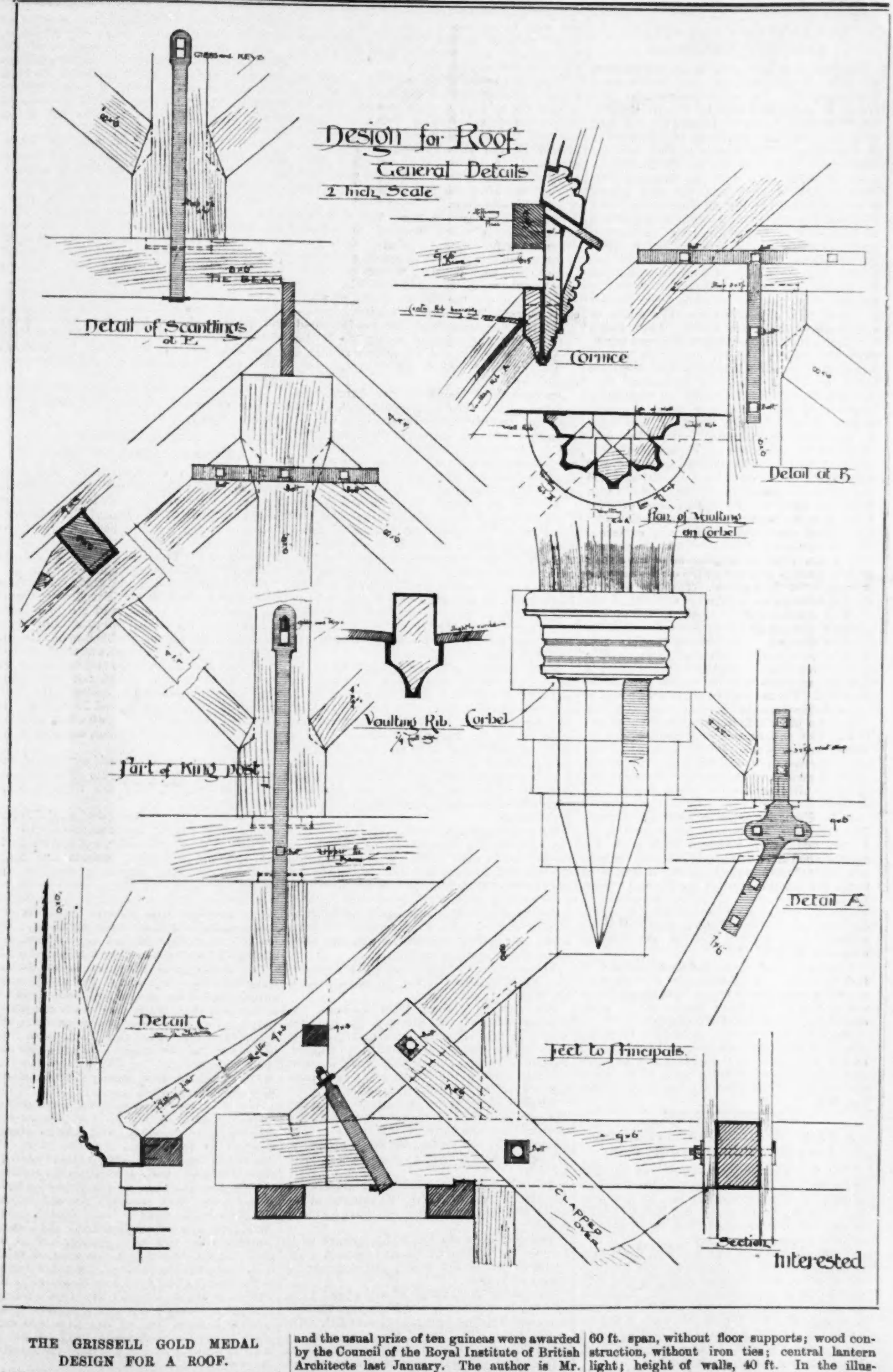
* Some remarks which Mr. Tarver intended to make in the discussion will be found on another page.


Design for Roof
General Details
2 Inch Scale
Gibbs and Keys
TIE BEAM
Detail of Scantlings at E
Cornice
Detail at B
Plan of Vaulting on Corbel
Vaulting Rib
Corbel
Part of King post
Detail A
Detail C
Feet to Principals
CLAPPED OVER
Section
Interested

THE GRISSELL GOLD MEDAL DESIGN FOR A ROOF.

We give a small-scale drawing and details of the design to which the Grissell Gold Medal and the usual prize of ten guineas were awarded by the Council of the Royal Institute of British Architects last January. The author is Mr. James Strong, of Liverpool. The subject set was a design for a roof over a railway station, 60 ft. span, without floor supports; wood construction, without iron ties; central lantern light; height of walls, 40 ft. In the illustration, the lower part of the walls is omitted.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

On Saturday last, Dec. 3, at the meeting of this Association at the Westminster Town-hall, Mr. Alexander (Shoreditch) presiding, a paper was read by Dr. W. Collingridge, Medical Officer of Health for the Port of London, on "The Duties of Port Inspectors of Nuisances." The powers of Port Sanitary Authorities conferred in the Public Health Acts of 1872, 1875, and the Diseases Prevention Act of 1883 had, he said, placed Port Inspectors, so far as their duties were concerned, in the same position as Inspectors of Nuisances of Urban Sanitary Authorities, ships being now legally considered as "houses." It would be difficult to exaggerate the importance of the duties of sanitary authorities on which the country relied for protection against invasions of cholera from foreign countries in a city which was the centre of commerce of the entire world. As on shore, the duties divided themselves into two parts: first, prevention; second, cure. In recommending preventive measures the inspector could often do more by persuasion than by compulsion, but he must be thoroughly acquainted, not only with the technical duties of an ordinary inspector, but have a thorough acquaintance with the construction of ships of all classes, from the stately liner to the humble barge. The first essentials were effective ventilation and the frequent cleansing of the bilge water. That the effect of the appointment of Port Inspectors has been valued and appreciated by those most concerned was strongly evidenced by the increasing number of liners and ships which now made arrangements to have their crew's quarters cleansed at the earliest possible moment after their arrival. The first point in dealing with the second part of the subject, the cure of disease, was to secure at the earliest possible moment notice of the outbreak of infectious disease. The lecturer strongly commended to the imitation of the whole metropolis a regulation which had worked well in the Port of London and in seven of the largest ports in the kingdom. The masters of ships were bound to report forthwith,—that is, within two hours or so,—any case of infectious disease, under a penalty of 5*l*. The patient was also compulsorily removed into hospital. Public opinion was fast becoming ripe for demanding compulsory notification of disease, and a regulation enforcing that principle all over London could not be long delayed.

In the discussion which followed, and in which Mr. Alexander, Mr. Jerram, Mr. Fairchild, Mr. Fuller, and other members took part, the speakers one after another objected strongly to the policy of putting the Inspector of Nuisances under the direct control of the Medical Officer. If they were ever to raise the status of inspector, as they were endeavouring to do, his authority should be collateral with, but on no account subjected to, that of the Medical Officer of Health.

After a vote of thanks had been accorded to the lecturer, Mr. Middleweek (Kensington) moved a resolution in favour of the compulsory notification of infectious disease, which, after discussion, was unanimously adopted.

During the evening an application from the North-Western District (Liverpool) for affiliation to the Association was discussed and adopted, and Liverpool was decided upon as the place for holding the forthcoming third provincial meeting.

A PROPOSED IMPROVEMENT IN THE CONSTRUCTION OF THEATRES.

The following communication was intended to be read by Mr. E. J. Tarver at the Institute meeting on Monday evening last, as a contribution to the discussion on Mr. Ralph Nevill's paper, elsewhere reported; but, owing to want of time, it had to be omitted:—

"I should mention, at the outset, that I have obtained a provisional patent for this improvement, which is tantamount to saying that it is, to the best of my belief, an original invention, so far as anything in this old world can be said to be original; for I hold the truth of the old adage that 'nothing comes from nothing,' and I admit that this idea has been suggested to me by the ancient Roman amphitheatres.

If, however, the ghost of one of those old builders were to accuse me of copying his ideas and were to contest the patent with me, I should reply, in the first place, that his patent was extinct; and, secondly, that the idea is altered to suit modern wants.

We always speak of the ancient Romans as a practical people, and, in this case, the opinion is borne out by their sensible arrangements for rapidly filling and emptying their vast amphitheatres. Remove the upper crust, as it were, formed by the tiers of seats, and the substructure is found to consist entirely of staircases, so that the mass of spectators must have melted away after the performance like a film of ice in a rapid thaw.

It is hardly necessary to say that a Roman amphitheatre is utterly unsuited to modern dramatic performances, consisting, as it does, of one continuous slope of seats rising from the arena to the back benches, whence our actors would be almost invisible and inaudible.

How, then, can the Roman system of staircases be applied to modern theatres?

This is the problem which I have endeavoured to solve, with the object of saving life in the case of fire or panic, and I have done so with a result,—on paper,—which has far exceeded my expectations.

An outbreak of fire during a performance is, happily, a very rare occurrence; still, it has happened, and may happen again, or it may be suspected, and the suspicion may produce a panic. Any means, therefore, of reducing to a minimum the distance between any seat in the house and the outer air must be a distinct gain in theatre-building.

Now, if we examine any ordinary theatre (I do not mean a circus or a lecture theatre, but a theatre with the usual arrangement of dress-circle, upper circle, and gallery), we shall find that, with the occasional exception of the gallery, these portions are invariably approached from a corridor behind the highest row of seats in each portion, and, supposing the pit to be on the street-level, every seat in these portions has to be approached, first by an ascent to these respective corridors, and then by a descent to all but the back rows of seats.

Many theatres are constructed with the dress-circle on the street-level, or nearly so, and with the pit and stalls below that level, a system which renders it impossible to have dressing-rooms, &c., below the pit, and one which is, so far, wasteful of space. Even in such cases the upper circle and gallery have to be approached by the ascent and descent that I have described and, the gallery being generally the fullest part of the house, this long route affects the safety of the largest section of the audience.

By reversing the point of approach, that is to say, by ascending immediately to the front or lowest tier in each portion, it is obvious that the distance between any seat in the theatre and the outer air is reduced to a minimum.

On working out a set of ⅛-in. scale plans of a theatre of precisely the same dimensions as an existing one in London which contains 766 seats, I was delighted to find that I obtained 1,064 seats, or half as many again.

This satisfactory result dispelled the objection that would be raised to the loss of seats where the emerging stairs occur.

Moreover, by placing these stairs at the extreme sides of the auditory, the audience would, in case of panic, immediately diverge towards the doors by which they entered, instead of converging, as they often do now, and they would also find themselves close to an exit door at the foot of each staircase.

Another advantage of this system is that any draughts admitted through the doors would be directed into the body of the house and be carried off by the ceiling ventilator, instead of giving one a stiff neck as they do now from behind.

There is yet another minor advantage in the fact that one enters facing the numbers on the backs of the seats, which can thus be easily found.

The entrances are not so far forward as to involve the danger of running towards a fire breaking out on the stage; the movement is rather sideways.

Comparing the number of steps (each 11 in. by 6 in., as required by the Metropolis Management and Building Acts Amendment Act, 1878) in this design with those of the existing theatre that I have alluded to, taking the pit as the datum level, I find that that theatre has twenty-six steps up to the dress-circle corridor (mine only fifteen), fifty-three up to the upper-circle corridor (mine only thirty-four), and eighty-four up to the gallery landing (mine only fifty-one).

It will be noticed that the position of the gallery in my design admits of a flatter gradient, and consequently an easier ascent to the back seats than a gallery which is placed further forward. This, of course, is due to the angle of the radial line struck from the foot of the stage.

Lastly, I would point out that my system admits of a cantilever construction, and thereby obviates the necessity for supporting columns, which are fidgeting, however small they may be.

I am quite prepared to find the small saloon accommodation objected to by those who think that repeated refreshments during long waits are necessary for the revenue of the manager. Other people, however, consider this a doubtful blessing, and find the repeated return of young gentlemen, smelling of cigarettes, a nuisance.

The diagram plan is merely suggestive. There are dozens of ways of treating the stairs and gaining saloons, &c., where the headway admits of it, and I see no reason why the curved dress-circle corridor should not be rendered picturesque, by cross arches and a skilful treatment of the recesses at the ends."

[It has been arranged to exhibit the diagrams at the adjourned meeting to discuss Mr. Nevill's paper in February.]

THE SARCOPHAGI OF SIDON.

The following communication, which has been received by the Chairman of the Palestine Exploration Fund from Professor T. Hayter Lewis, appears in the *Times* of Thursday last. Professor Lewis has returned from a visit to Constantinople, where he was allowed by the Director of the Imperial Museum to see the photographs of the sarcophagi:—

"The following notes were made chiefly from descriptions given by his Excellency Hamdi Bey personally to myself, and are to a large extent in his own words. They may form useful addenda to the very admirable account given in the last Quarterly Statement, and also to Hamdi Bey's own description in the last number of the *Revue Archéologique*. I had not seen these until after my return to London. The shaft was about 16 ft. by 13 ft., and 50 ft. deep. In chambers leading out of it, of which he gives plans and sections in the *Revue*, were found the following:—

Three Phœnician anthropoid sarcophagi, two of these being in white marble (one male and the other female), and the third in black marble (female).

Seven sarcophagi of Greek design, of different epochs, carved out of Greek marble blocks.

Three of these are similar, and one simply in the form of pedestals, without any figure sculpture, but with beautifully moulded and enriched cornices and bases, which much resemble those of the sarcophagus in the British Museum brought from Crete. The covers are coped, and with pediments and acroteriæ. The fourth is of the peculiar tall Lycian form, surmounted by a curved roof, with gables, of which we have two good examples in the British Museum. But, in place of the usual panels in and beneath the gables, the Sidon tomb has griffins and other sculptures which are purely Greek. On one of the long sides there are, splendidly-sculptured, two cars, with four horses each, in full career. On the other side is a hunting scene. The fifth sarcophagus (not in the Lycian form) is equally well sculptured with Assyrian subjects.

The sixth represents a Greek Ionic temple with antæ, but with three-quarter columns only between the two antæ, and three-quarter columns to the sides. Between each two columns or antæ is a female figure showing signs of deep affliction. In all there are eighteen of these statues. The temple rests on a stylobate, having a finely-moulded base and surbase, the dado being enriched with figures, partly sculptured and partly painted. The cover represents the roof of a temple, and in the pediment at each end is a fine group of sculpture. As a curious variation from the temple form, there is along each side, surmounting the cornice, a tablet, on which is carved a funeral procession. Such a decorative feature is not unusual in sarcophagi of late date, one such being in the British Museum, but I can call to mind no example of such a feature surmounting the cymatium in any temple.

All the above sarcophagi show large remains of coloured decoration, and, as described to me, confirm Hittorff's theories as given in his work on Sicily.

The seventh sarcophagus is the grandest of all. It is out of one block of white marble, about 11 ft. long, with a coped and pedimented cover, and having no columnar decoration, but with an enriched cornice and base, the panels between these, on each side, being filled with sculptures of marvellously fine execution. On two of the sides the subject is the chase; on the other two are represented combats between warriors both on horse and foot. One prominent figure reminded Hamdi Bey of that of Darius in the famous mosaic from Pompeii (and having seen this recently I quite agree with him), and certain characteristics on another of the principal figures induces him to assign it to Alexander.

In any case, there can scarcely be a doubt that the sculptures represent a battle between Greeks and Persians, and most probably between Darius and Alexander. The cover of this magnificent tomb is of the ordinary coped form, but is enriched with rows of heads on the eaves line and on the ridge,—a very unusual style of finish, but which may be seen partly carried out on a small scale on one of the Greek sarcophagi figured in Sir C. Fellows's "Asia Minor." At each end of the eaves is a lion. This also reminds one of the lions' heads and fore paws sculptured in the roof of another Lycian tomb figured in the same work.

The architectural details of all these sarcophagi, so far as I can judge from the photographs, are of the Greek type of the best period, without a trace of Roman influence, and the sculpture appears to be of the highest class. It is altogether different from the bold style of the Pergamus sculpture, and much more nearly resembles the beautifully delicate carving of the Parthenon frieze, of which the horses, the figures, and the drapery of the Sidon monument strongly remind one.

Hamdi Bey thinks that it is probably by Lysippus or his school; but as to this, only some one specially qualified by a study of ancient examples (and such a one, no doubt, he will consult) could give a definite opinion. He will have to determine, to begin with, whether the sculpture is the product of an artist accustomed to work in marble, or whether it is not that of one accustomed to work in bronze. I can only venture to suggest, from certain details, that the latter is the case.

But it is not only by the sculpture that this monument has been adorned. It has been so, in the most careful and artistic way, with colouring, which was (and I trust still is) in a perfect state of preservation, and producing a charming effect, each of the different reds, purples, violets, &c., being put on in various tints and gradations with great delicacy, gold being sparingly applied and with great judgment. The spears, &c., are of bronze. The flesh of the figures is not coloured.

To show the care which has been taken with this decoration I may mention that the portions of marble which have been left untinted have been treated in three different ways,—viz. (1), by the ordinary finish; (2), by being slightly roughened; and (3), by an exquisitely finished surface such as one finds in the finest Greek sculpture.

As to the date of all these works, except the one with the well-known Phœnician sarcophagus (to which I allude below), there is no guide whatever beyond what the sculptures tell. The absence of any inscription is not surprising, inasmuch as very few of the sculptured sarcophagi (chiefly Græco-Roman) left to us are inscribed, and I have Hamdi Bey's authority for saying that there is not a line, not a word, which could give a clue to the date, nor anything definite as to the persons for whom these splendidly-adorned tombs were made.

How was it that a great sepulchre should have been hewn 50 ft. deep in the solid rock, chambers carved out from it, these immense blocks of the finest marble brought from Greece, carved by the best Greek sculptors, painted (it would seem) by the best Greek artists, and then lowered into their resting-places in times of no great antiquity, and yet not a single record of any kind be left to give a clue to the names of those for whom such great works were done? Possibly, in the careful study which Hamdi Bey is giving to the subject, this question may receive an answer.

It will be months before the sarcophagi can be seen by any one, as it would be highly dangerous to expose them, however slightly, to the dust and damp of a Constantinople winter, as would be the case if they were uncovered before being placed in the building now being erected for their reception. To preserve their colouring during their removal from Sidon the greatest care had to be taken. The workmen were required to wear gloves, and the sculptures were protected by having cotton wool stuffed behind them most carefully. This was done by Hamdi Bey himself, the whole then being covered by layer upon layer of soft material.

The last sarcophagus to which I shall allude is the famous one of the Priest and King Tabuite, the account of which occupies a large portion of Hamdi Bey's article in the last *Revue Archéologique*. It is of black marble, the inscription on it showing it to have been the tomb of the son of Esmunazar, King of Sidon (I give the name as spelt on the tablet in the Louvre). But Tabuite's tomb differs in many important particulars from that of his father. Both are anthropoid, but Esmunazar's, of which we have a copy in the British Museum, shows the human form only in the head and shoulders, the lines of the sarcophagus being carved thence straight down in a tapering form to the raised tablet which marks the position of the feet. This is the case also with ten out of the eleven other sarcophagi in the Louvre brought from Sidon, and in the only one (I believe) in the British Museum brought from the same site. But Tabuite's tomb has the flowing lines which may be seen in the numerous Egyptian anthropoid sarcophagi which are in the same collection and in our own Museum, and which give, to some extent, the outlines of the figures. One corner of this tomb has been cut off, thus giving it an irregular shape, and this part has been polished, and a band of Egyptian hieroglyphs, which passes round the block, is carved round this polished corner.

We can scarcely suppose that a king who could afford to have so splendid a tomb made for him would accept an imperfect block of marble for it, and it seems likely, therefore, that it was made originally for another person in ancient times in Egypt, and repaired and re-used at a later period for Tabuite.

The descriptions and drawings of this interesting tomb will form one of the most attractive chapters in the detailed and illustrated account of the Sidon monuments which Hamdi Bey is now preparing for publication; and considering the amount of care which he took in their preservation, every one will be glad to concede to him the full honour and credit of first conveying the description of them to the public in an authentic form. No doubt it would have been better to have retained them on their ancient site, if they could have been so retained with safety. But my experience in the East makes me confident that such a course would have resulted in the eventual destruction of these splendid monuments by Moslem fanatics and Arab dealers.

Athenæum Club. T. HAYTER LEWIS."

COMPETITIONS.

Proposed Public Building for New Barnet.—The New Barnet Public Building Committee having invited architects to send in competitive designs for a building to contain a large hall, about 75 ft. by 55 ft. (to seat not less than 700 persons); second hall, about 40 ft. by 25 ft., with ante-rooms and other requisite offices; also public and professional offices, caretaker's apartments, &c., the cost not to exceed 5,000*l.*, have, we are informed, received sixteen sets of designs, which are to be publicly exhibited a the assembly-rooms, New Barnet, on Tuesday evening, December 13th.

Walton-le-Dale Sewerage Scheme. — Some little time back the Local Board of Walton-le-Dale, near Preston, Lancashire, advertised for schemes for the sewering and disposal of the sewage of their district. In response to this, many schemes have been sent in. The ultimate decision as to the merits of the various schemes was submitted to Mr. Thomas Fenwick, C.E., of Leeds, and we are informed that he has just awarded the first premium to Mr. William Wrennall, C.E., of Liverpool, and the second premium to Messrs. H. T. Johnson & Co., civil engineers.

The City and Guilds of London Institute.—The prizes and certificates gained during the past year will be distributed on Thursday, the 15th inst., at Carpenters' Hall, by Sir John Lubbock, Bart., M.P.

Illustrations.

THE VILLA MONTECCHIO, NEAR VICENZA.

WE give illustrations of the Villa Montecchio, near Vicenza, the property of the Contessa Maria Nievo-Bonin, which has been lately restored by Signor Michele Cajrati, a talented architect of Milan.

The villa still retains (in part) its ancient walls, though these have been merged in the extensive alterations necessary when transforming a ruined castle of the eleventh century into a princely villa of the nineteenth.

The old castle suffered all the vicissitudes of war; in that stirring time it was stormed by the Vicentines in the days of Ezelino, 1232. Its fortifications were destroyed by the Paduans in 1386, so that Antonio della Scala, of Verona (who had erected them anew after the attack of the Vicentines) had to abandon the castle finally in 1387. The Counts Nievo had the first investiture of the land. It then passed to the Sanbonifacios, of Verona, and the family of Montecchio (Montague), so well known as that of the fair Juliet, is said to have sprung from this ancient house. In the last century the castle was converted into a villa in the Classical style by its owners the Counts Nievo; but the effect was bald, and the plan so inconvenient that it was again altered, though with little success, later on, and has now received its latest transformation at the hands of Signor Cajrati.

The Villa Montecchio (its high southern façade crowned with crenelated parapets imitated from the fourteenth-century old castle of Colleone in Thiene) rises on an elevated plateau,—a broad terrace 625 ft. long (running westward across its southern front),—commanding fine views over a country dotted with hill villages, church spires, and country-houses,—the snowy peaks of the Alps in the background, and the deep blue sky of northern Italy overhead. The gardens round the palace are formal in design, while conservatories full of exotics and tropical plants are added to beautify the interior.

The external walls, from basement to cornice, are covered with mouldings, carvings, and traceries of fantastic variety and colour,—arabesques, scrolls, coats of arms, monograms, and full-sized figures of warriors and historical personages, such as one sees painted on palace fronts in the backgrounds of Giovanni Bellini and Vittore Carpaccio's pictures in Venice.

MANTELPIECE AND PORCH IN TERRA COTTA.

THESE were designs made by the architect, Mr. W. H. Sugden, as a commission for a client, but owing to circumstances they were not carried out. We give them as what appear to us good examples of characteristic terra-cotta treatment.

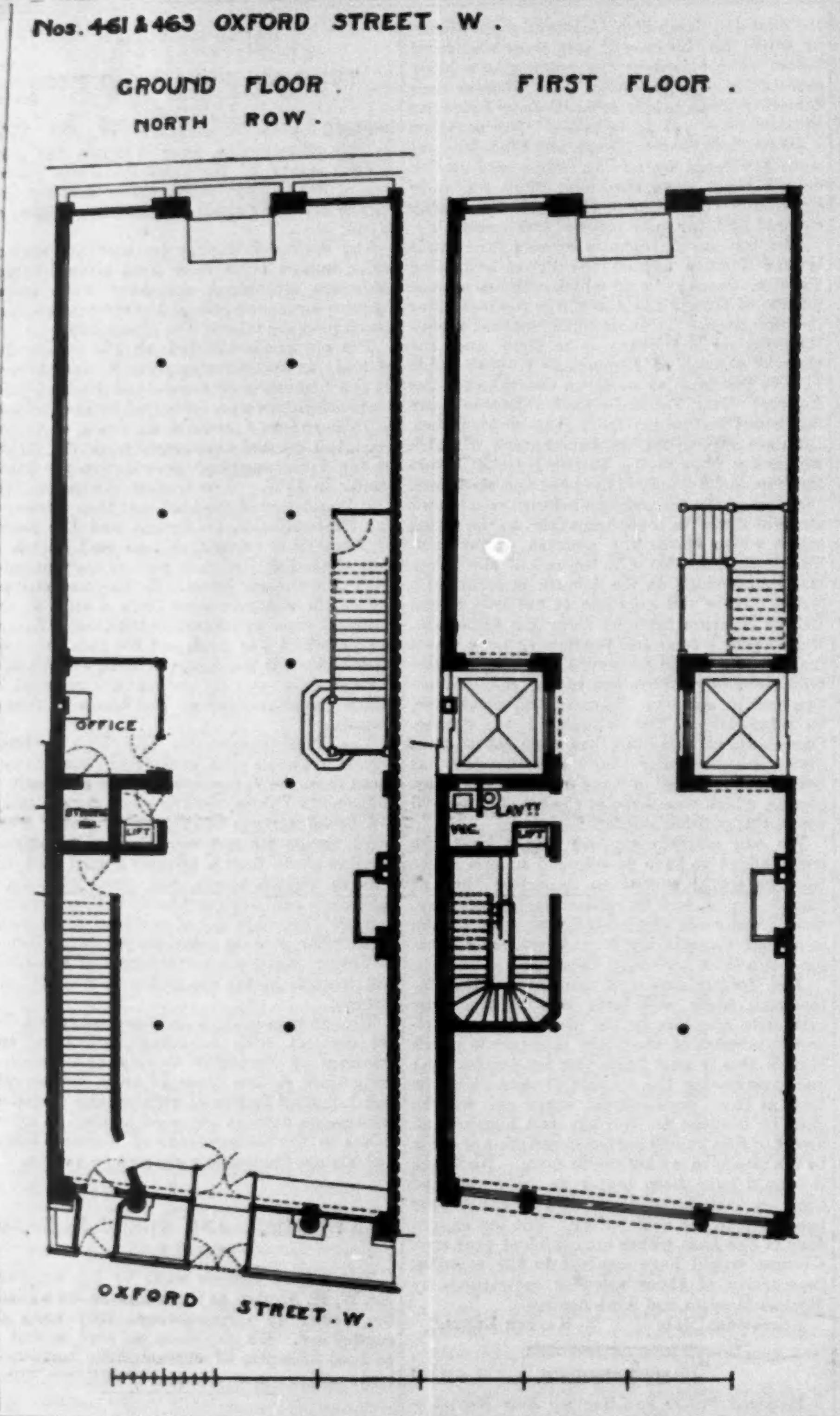
SWIMMING BATH, BOURNEMOUTH.

A NEW swimming-bath and private baths are now in course of erection in the Bath-road, Bournemouth. The illustration gives the view of the entrance as it is approached from the pier. The site is on ground much lower than the road, and it was necessary to keep the roof of the swimming bath as low as possible to avoid interfering with the view of the houses on the opposite side of the road.

The bath is 75 ft. long and 30 ft. wide. The depth varies from 6 ft. at one end to 3 ft. 6 in. at the other. It is constructed of Portland cement concrete, and lined throughout with white glazed bricks. The dressing boxes are of pitch pine, and a gallery is arranged overhead to enable visitors to view races or entertainments.

The elevation towards Bath-road is faced with Fareham red bricks and red Mansfield stone dressings, and the roofs are covered with strawberry-coloured tiles.

It is proposed during the winter months to maintain an even temperature of 75° in the swimming-bath, and the heating is obtained by the admission of steam into the water through a perforated copper pipe. A Cornish boiler supplies the steam for this purpose, as well as for pumping the salt water from the sea. The water is pumped up through a suction-pipe,



which is carried out to the head of the pier into deep water, so as to ensure its purity.

Eight private baths are also to be constructed of concrete and glazed bricks, and to be sunk below the floor and entered by steps.

Ladies' and gentlemen's waiting-rooms, with lavatories attached, and an entrance-hall, complete the arrangement.

The building has been carried out from the designs of Mr. John Pollard, engineer.

NOS. 461 AND 463, OXFORD-STREET.

This building is part of the large reconstruction of premises on the south side of Oxford-street, on the Duke of Westminster's estate, and was recently erected from the designs of Messrs. Thomas Chatfeild Clarke & Son at a cost of about 6,000*l*.

The basement, ground, and first floors are devoted to the purposes of business, so that clear space and good light were here the primary considerations.

The large amount of glass on the ground and first floors in the Oxford-street elevation was necessary for the exhibition of furniture and fine-art goods.

The second, third, and fourth floors of the premises are used as a private dwelling, and are fitted with every comfort and convenience.

The front, which partakes largely of the style of the Brothers Adam, is executed in Portland stone and red brick, the roofs being of green slates.

The contractors were Messrs. E. Lawrance & Sons, of Wharf-road, City-road; the carving was executed by Mr. Anstey; and the constructional cast-iron work was supplied by Messrs. Young & Co., of Eccleston Ironworks, Pimlico.

SIDLESHAM VICARAGE, SUSSEX.

This house has been erected by a grant of 1,500*l*., given by the Ecclesiastical Commissioners, who are landowners in the parish, aided by a sum of 100*l*. voted by the Chichester Diocesan Association. These sums together have covered all expenses connected with the building, including the drives and approaches. The accommodation is that laid down by the Commissioners, with the addition of a dressing-room and two attics and an increase in the size of the dining-room beyond the minimum recognised by them. To obtain this result careful attention to economy was given by the architect, who had, however, to provide that everything should be thoroughly substantial, or he would find it vain to submit his drawings to the thorough criticism of the Commissioners' architect. The lower story is enclosed with 16-in. hollow walls of red brick, and the first floor with weather tiling secured on brickwork. The works have been carried out by Mr. W. Irish, of Lavant, near Chichester, under the direction of Mr. Lacy W. Ridge, the Diocesan Surveyor.

HOUSE AT CHARING, KENT.

This house has been erected for Mr. Frederick Hardwick, M.D., on a fine site close to the railway station, and overlooking the ancient and interesting village of Charing, in Kent. There are good views in all directions except towards the south-east. That towards the north, which includes Charing Church and the remains of the Archbishop's Palace, backed by the Chalk Downs, is so particularly interesting that special provision has been made for its being seen from the drawing-room. Beyond the rooms shown on the plans, the house contains two large attics, one smaller room, and a box-room on the second floor; and a cellar in the basement.

The tender of Mr. Thomas Coast, of Charing, was accepted at a sum of 1,436*l*. 5s. for the house and stables. There has, however, been some additional outlay on the buildings, grounds, and fences. The works have been satisfactorily carried out by Mr. Coast and local tradesmen working with him, under the direction of the architect, Mr. Lacy W. Ridge.

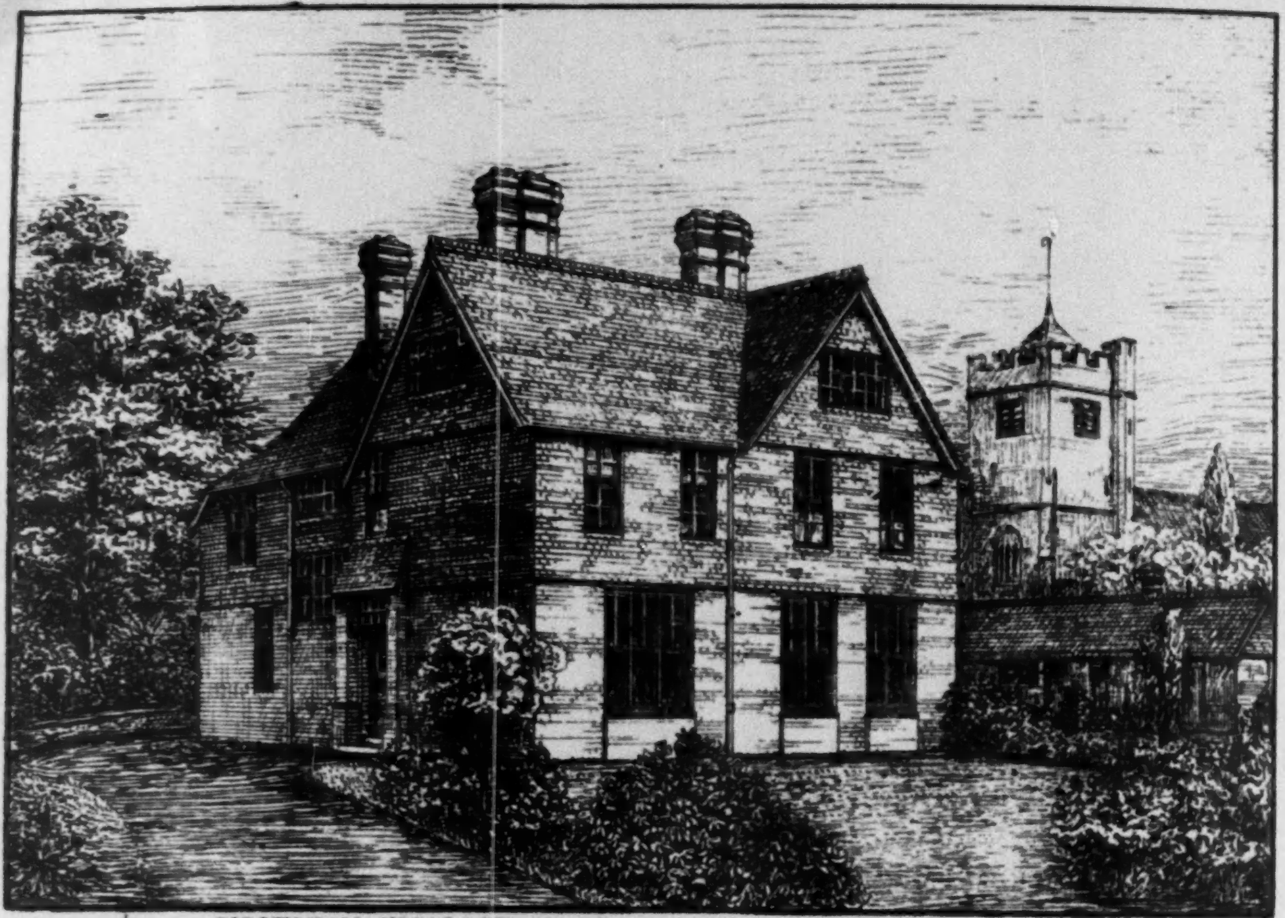
ANCIENT MONUMENTAL SLAB.

The slab from the Cathedral at Siena (of which an illustration is given) is incised and filled with mastic. The arabesques in the border are black marble and mastic.

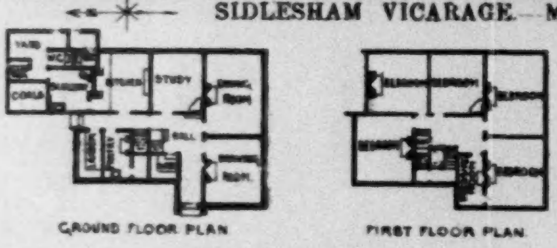
The present cathedral is only the transept of the original design; the drawings of the whole scheme, made by the architect, Maestro Lando, still exist. The part used as the choir contains the grand pavements, by Beccafumi, which are chiefly in dark grey marble inlaid upon white. These are now visible, the planking having been recently removed which covered them for the past century or more.

The drawing is an illustration from a work to be published almost immediately, on "Ancient Sepulchral Monuments," by Mr. W. Brindley and Mr. W. S. Weatherley.

Society of Engineers.—At a meeting of the Society of Engineers, held at Westminster Town Hall on Monday evening, December 5th, Professor Henry Robinson, President, in the chair, a paper was read on "A New Formula for the Flow of Water in Pipes and Open Channels," by Mr. Edgar C. Thrupp. The author said that, having worked out, by means of graphic diagrams, a formula for the flow of water in pipes, based on a large number of experiments by M. Darcy and others, with some by himself, he was induced to try, this year, how far experiments on the flow of water in open channels (such as those by Darcy and Basin, and by Major Cunningham) would be amenable to the same mode of treatment. The results were not only satisfactory, but unexpectedly threw light upon some points in the question of the flow in pipes, which had before been difficult to explain. He had thus been enabled to obtain a general formula, applicable both to pipes and open channels, and taking into account the effects on velocity of the varying relations between hydraulic depth and roughness of surface, in a manner that had not hitherto been done. After describing the experiments of Professor Osborne Reynolds, which brought out the curious fact of a "critical velocity" at which eddies come in, for a limited range of velocities, after which an even flow again takes place, the author described the apparatus he had himself used, and showed the graphic results of experiments, which he had also reduced to tabular forms. He then gave Reynolds's formula, and Hagen's, of which latter his own was a modification, the changes introduced having for their object to express the effects of various degrees and kinds of roughness in the surfaces flowed over, with varying hydraulic depths. He concluded by justifying the effort to make a more accurate formula, by comparing the results of experiments with the results obtained by calculation.



SIDLESHAM VICARAGE.—MR. LACY W. RIDGE, F.R.I.B.A., ARCHITECT


YARD
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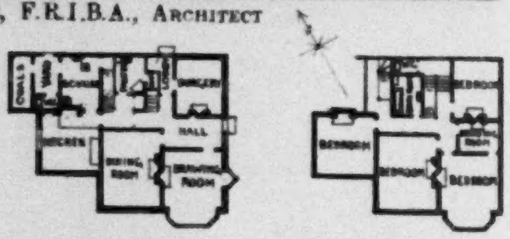
BEDROOM

GROUND FLOOR PLAN

FIRST FLOOR PLAN

SIDLESHAM VICARAGE


COALS
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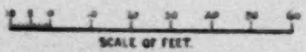
GROUND FLOOR PLAN.

FIRST FLOOR PLAN.

HOUSE AT CHARING.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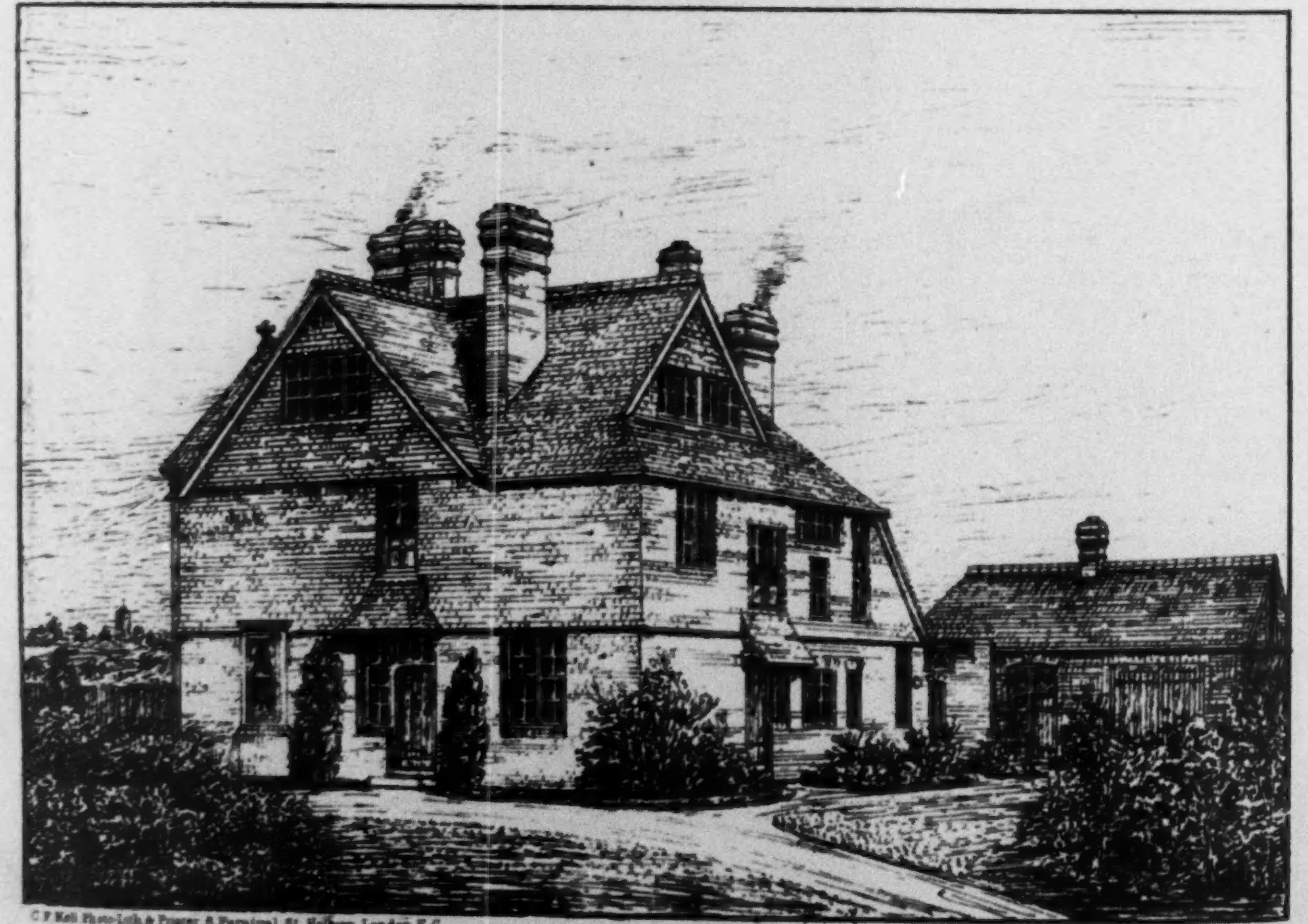


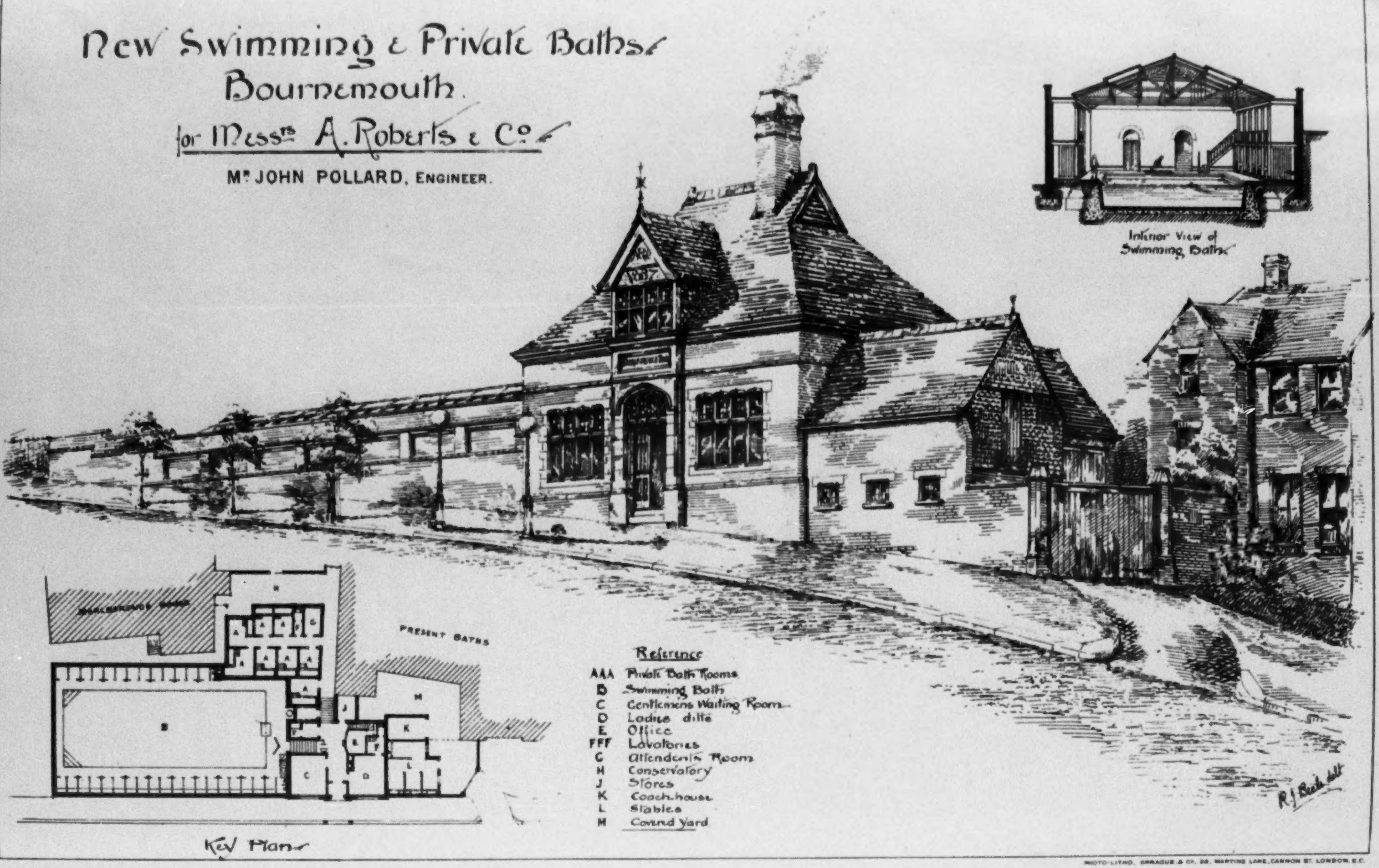
C.F. Kell Photo-Lith & Printer 8, Furnival St Holborn, London. E.C.

HOUSE AT CHARING, KENT.—MR. LACY W. RIDGE, F.R.I.B.A., ARCHITECT.

New Swimming & Private Baths, Bournemouth

for Messrs A. Roberts & Co.

Mr JOHN POLLARD, ENGINEER.


Interior View of Swimming Baths
PRESENT BATHS
Key Plan

R. J. Beale delt.

Reference

AAA	Private Bath Rooms
B	Swimming Bath
C	Gentlemens Waiting Room
D	Ladies ditto
E	Office
FFF	Lavatories
G	Attendants Room
H	Conservatory
J	Stores
K	Coach-house
L	Stables
M	Covered Yard

PHOTO-LITHO, SPRAGUE & Cº, 22, MARTINS LANE, CANNON ST. LONDON, E.C.

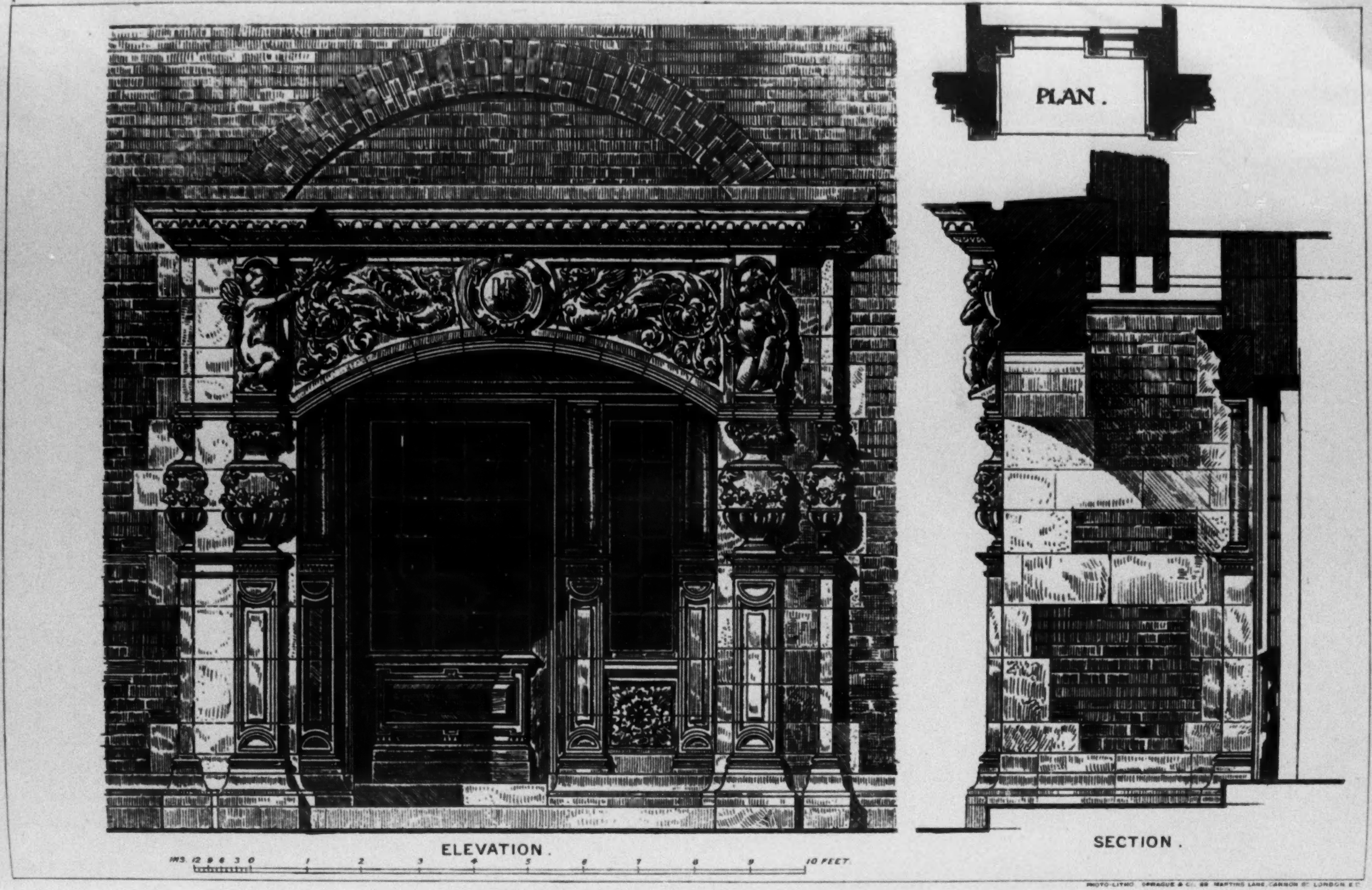

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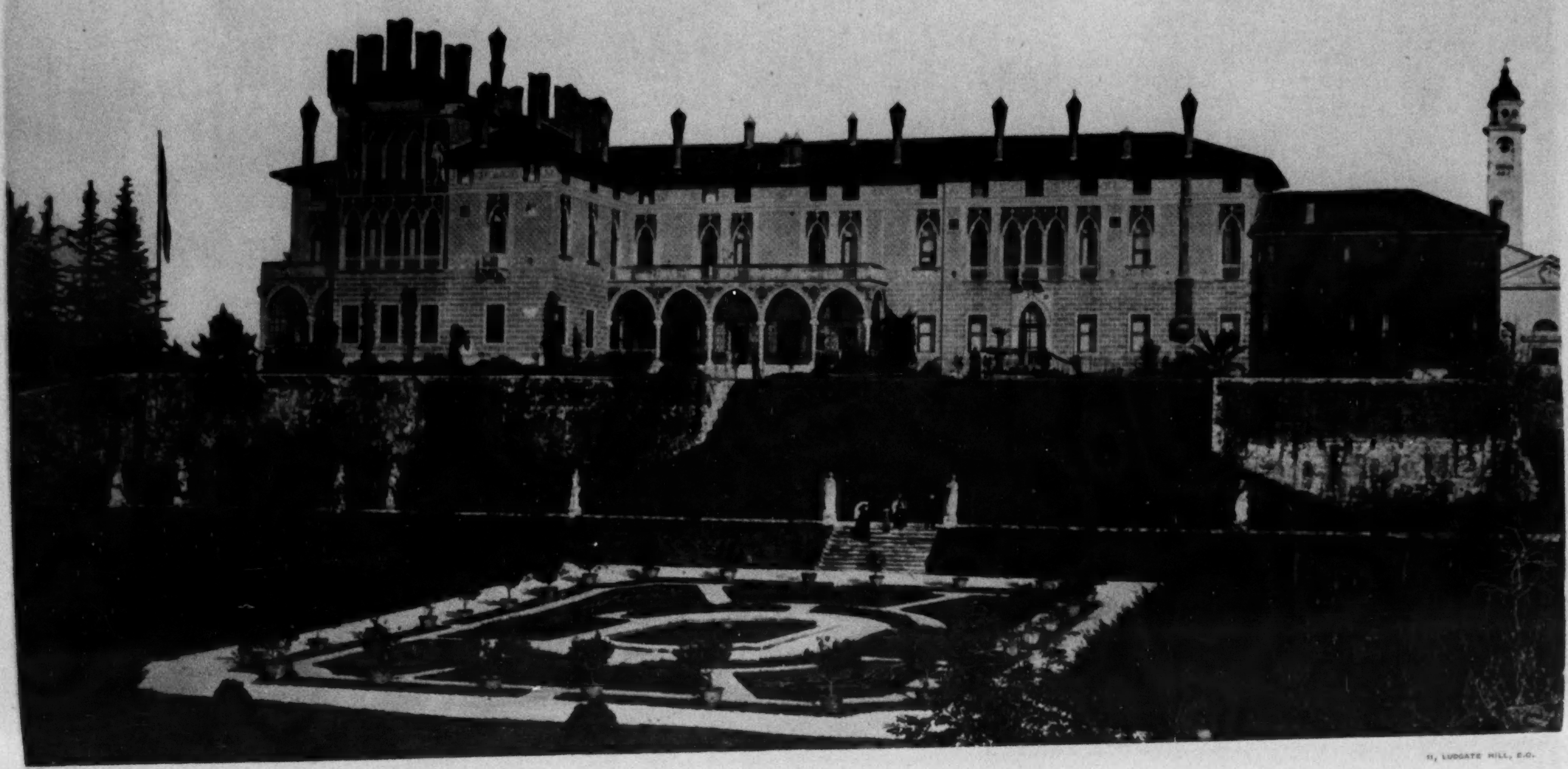
PHOTO-LITHO. SPRAGUE & C°. 22 MARTINS LANE, CANNON S^T LONDON E.C.

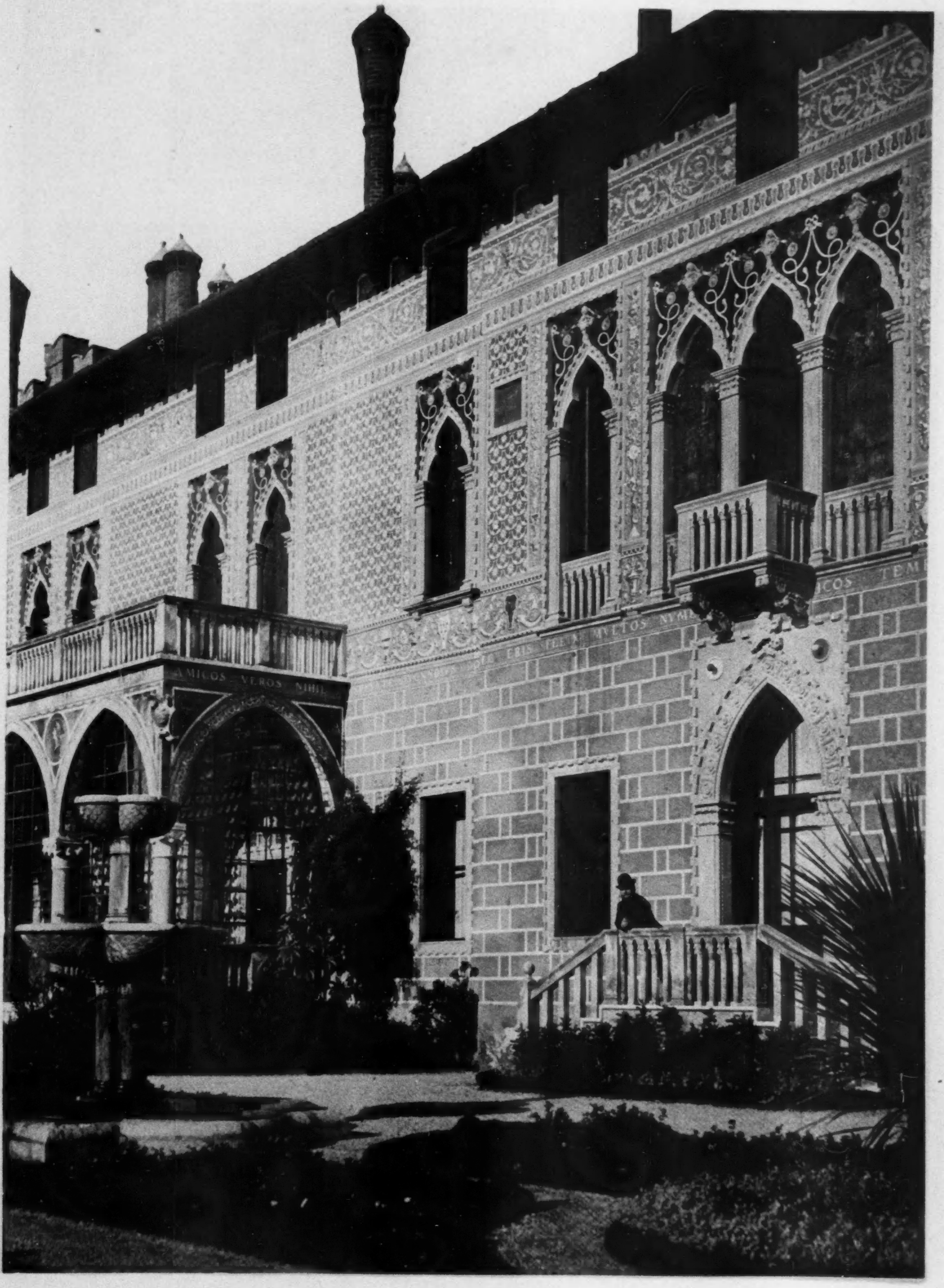
AN ENTRANCE PORCH IN TERRA COTTA.—Mr. W. H. Sugden, Architect.



S. B. BOLAS & CO., PHOTO PRINTERS,

11, LUDGATE HILL, E.C.

VILLA MONTECCHIO, NEAR VICENZA (AS RESTORED).—SIGNOR MICHELE CAJRATI, ARCHITECT.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S. E. BOLAS & Co., PHOTO PRINTERS, 11, LUDGATE HILL, E.C.

VILLA MONTECCHIO, NEAR VICENZA (AS RESTORED)—SIGNOR MICHELE CAJRATI, ARCHITECT.

PORTION OF GARDEN FRONT, LARGER SCALE.

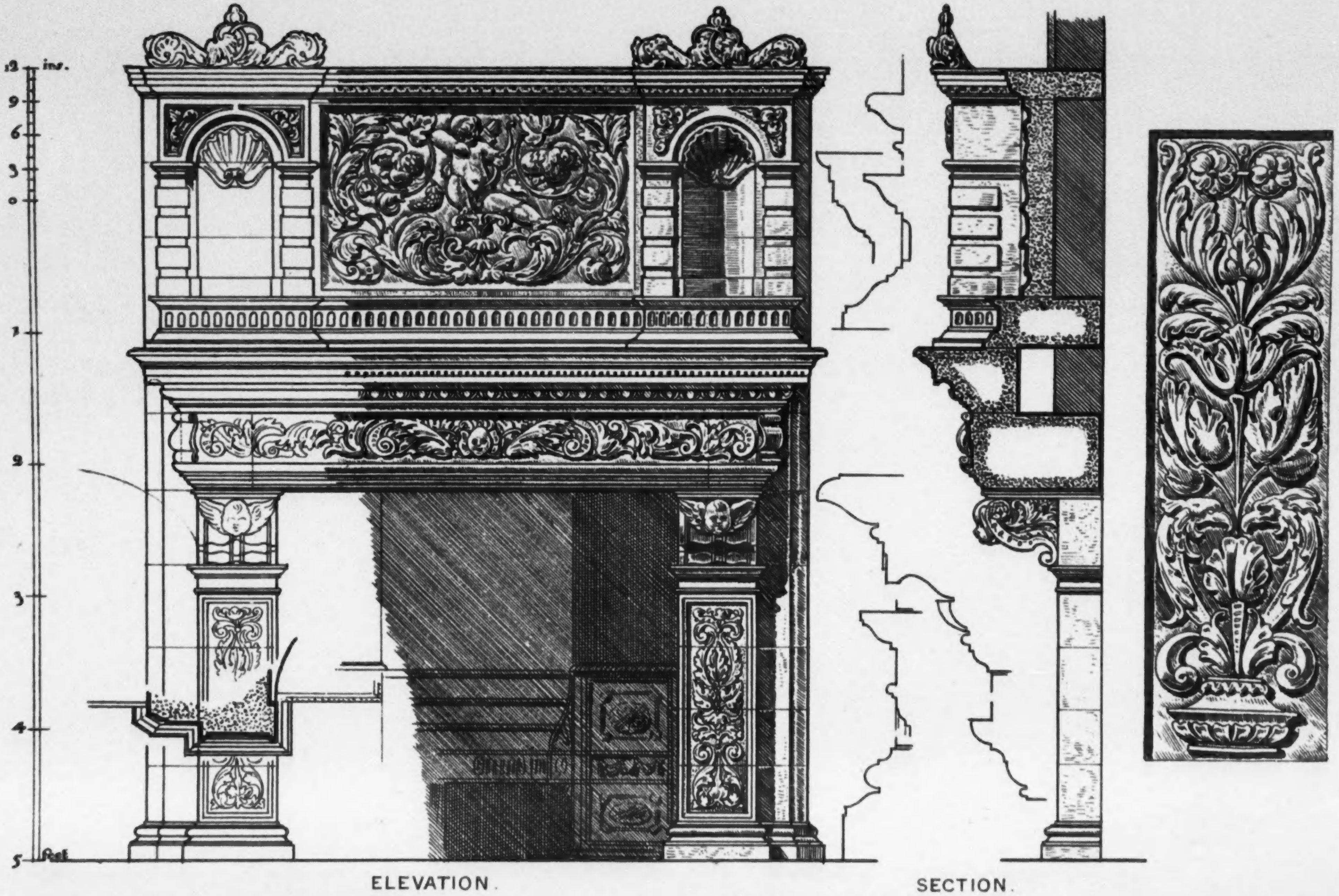
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PHOTO-LITHO. SPRAGUE & Cº. 22, MARTINS LANE, CANNON Sᵀ. LONDON E.C

A CHIMNEY PIECE IN TERRA COTTA.—Mr. W. H. Sugden, Architect.

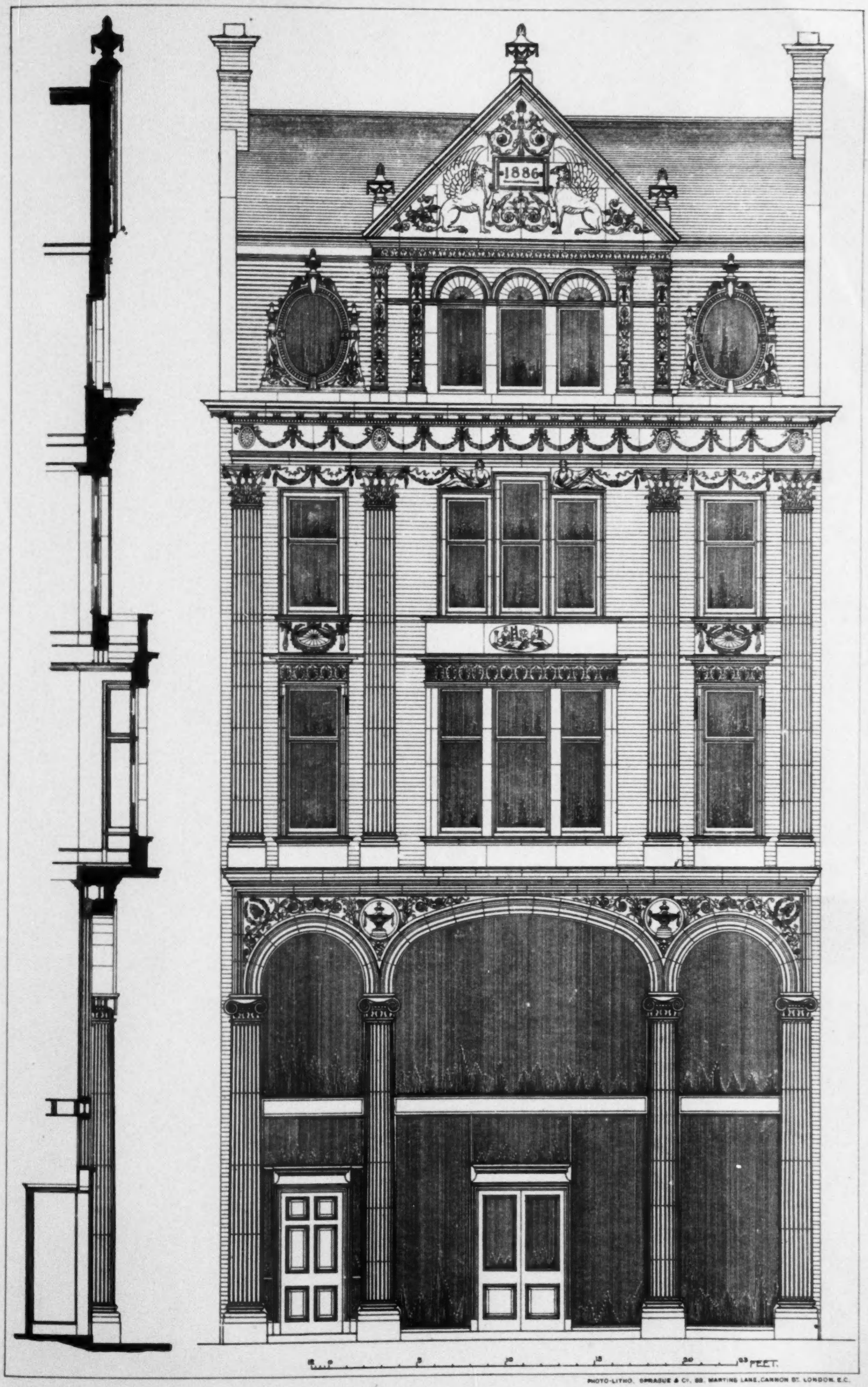
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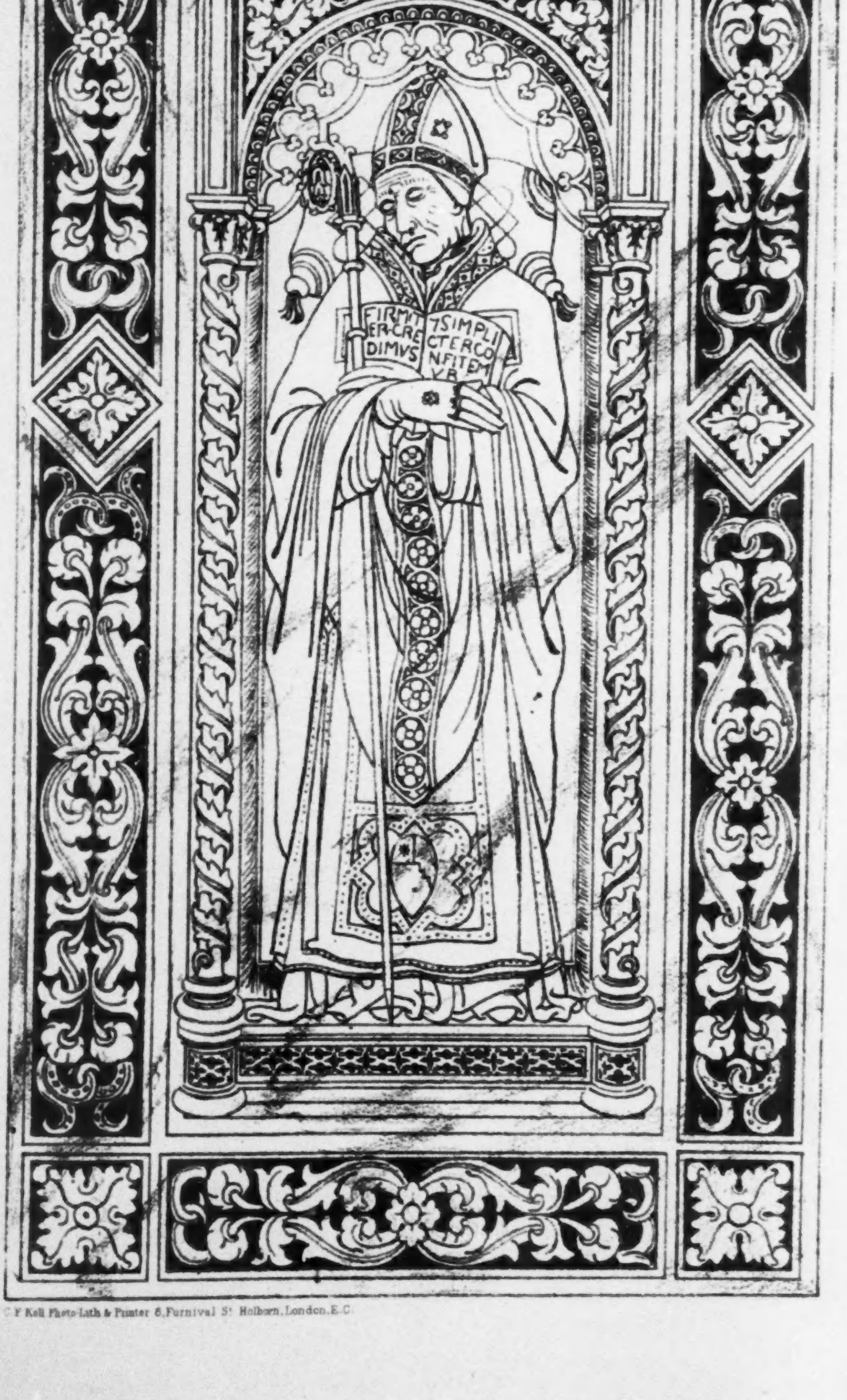
PHOTO-LITHO. SPRAGUE & Co. 22, MARTINS LANE, CANNON ST. LONDON. E.C.

PREMISES IN OXFORD STREET.—Mr. T. Chatfeild Clarke, F.R.I.B.A., Architect.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INLAID SEPULCHRAL SLAB, SIENA CATHEDRAL.—DRAWN BY MR. W. S. WEATHERLEY, F.R.I.B.A.

PERSPECTIVE AND APPARENT FORM.

ARCHITECTURAL ASSOCIATION.

The fourth meeting of this Association for the present session was held on the 2nd inst., in the meeting-room of the Royal Institute of British Architects, Mr. John Slater, B.A. (President), in the chair.

The Chairman announced that a requisition, signed by several of the members, had been received, asking the Committee to convene a special business meeting, to take such steps as might be necessary for insuring the proper observance of Rule 22. It would be impossible to hold the special business meeting on the Friday fortnight, as Mr. T. G. Jackson, of Oxford, would then read a paper entitled "The Proposal to make Architecture a Close Profession by imposing tests of Examination and Registration." By that time, however, the Committe would have fixed the date for holding the special meeting.

Mr. W. Burrell (Hon. Librarian) announced the donation to the library of two copies of the "Architect's Register" and the "Transactions" of the Civil and Mechanical Engineers' Society.

Mr. F. T. Baggallay, A.R.I.B.A., read a paper entitled "Perspective Drawing, and the Apparent Form of Objects." The following is the substance of it:—

The outline of most objects, at any rate of inanimate objects of simple form, such as buildings, is sufficiently constant to enable us to predict, pretty accurately, how it will appear from a given point of view under certain given circumstances, and even to draw on a sheet of paper or other surface an outline which, looked at in a particular way, will, theoretically, exactly resemble the outline of the object when looked at in a similar way. Further than that,—and this is what we usually try to do,—we may, by choosing our conditions carefully, draw an outline which, looked at in an ordinary way as drawings are generally looked at, will resemble the outline of the object itself with something very closely approaching to accuracy.

This is all that perspective science pretends to do, or can do. It enables us by a simple scientific method, when we know the real form and outline of an object, to make a drawing on paper which, looked at in an ordinary way, so strongly resembles the outline of the object as seen from a particular point of view that we cannot see where the two differ, and hardly that they do differ. Put in that way, it does not sound very much. But, when we think how immeasurably more is thus done for the sense of sight than can be done for three at least of our other four senses, it seems a great deal, and we cannot, moreover, escape the conclusion that some power, necessary to produce accurate impressions, must be wanting in our powers of vision, at least under some circumstances, or we could not possibly produce anything differing from something else as much as a drawing differs from a building, but which at the same time presents to the eye a scientifically correct impression of the other thing in a most important particular.

My interest in this subject was first stirred by a paper read before this Association on November the 24th, 1876, by Mr. Augustus Frere, which he called "Binocular Perspective and Natural Drawing,"—a clever paper, in which, after pointing out that the greatest masters have frequently not drawn in accordance with the laws of plane perspective, the author went on to show that we had been furnished with two eyes because "with one eye we have little cognisance of visible position"; that an ordinary perspective drawing represents things only as we see them with one eye; and that "our eyes have no inborn power of distinguishing the forms or magnitudes of objects, nor can they discern their distance from themselves." After going very carefully into the structure of the human eye and the laws of vision, Mr. Frere ended by giving us a set of rules for producing pictures of what we see with two eyes.

As a matter of fact, it does not need much demonstration to prove that it is, not only practically but theoretically, impossible to represent on a flat surface, or to a small scale, even the crudest outline of a solid object as we see it with our two eyes. I do not mean that our imperfect skill stands in the way. If a draughtsman were ever so skilful, he could not do it. As pointed out by Mr. Frere, Leonardo da Vinci paid much attention to perspective, and "came to the conclusion that objects could not be represented in a picture as seen in nature"; and Malton, in his book, says,—"Artists would have all objects represented in perspective as they appear to the eyes. There is no such thing to be done. It is not in the power of art or science to represent on a plane any single object as it appears."

What stands in the way is not so much a difficulty as an impossibility; and, if by binocular perspective, is meant a science to enable us to draw objects as we see them with two eyes, in the same way that ordinary plane perspective does enable us to draw objects as we see them with one eye, then no such thing as binocular perspective can possibly exist.

Forgive me for calling your attention for a moment to the simple natural laws which govern our sight of objects. We see an object by means of rays of light reflected from the object upon the retina of the eye. These rays, originating in a luminous body, proceed from that body in every direction, and striking upon surrounding objects are reflected from every part of those objects in every direction. Such of these reflected rays as happen to enter the pupil of one of our eyes strike upon the retina and produce a sensation which we describe as seeing the points from which the rays were reflected. All rays of light proceed in straight lines; that is to say, they do so in a vacuum; and the refraction that they undergo in passing into pure air, or from air of one denseness into air of another denseness, is so slight that it may usually be neglected. The area of the pupil of the eye, being greater than that of any one point in the object looked at, is entered by a large number of rays from each point, called a cone or pencil of rays; but that cone may conveniently be represented by the axial ray, called the central visual ray, which is, of course, a straight line, so that, for the sake of simplicity and convenience we may conceive the eye seeing every point of an object by means of a ray of light proceeding in a straight line from that point to the retina of the eye, where it impresses the image of the point, and the spectator is thereby made aware of the direction in which the point lies. If the ray proceeded from a different direction, the image would, of course, either rest upon a different part of the retina, or the whole eye would turn round to receive it. In either case the brain would be aware of the change. This happens in each eye, and one eye, therefore, is enough to tell us the direction in which a point lies; but it is not enough to tell us how far off the point is. If it were nearer or more distant, the image brought by the straight ray of light would still be upon the same spot on the retina, and, except for a slight difference of distinctness, would be exactly the same image, and, the effect upon the eye being thus exactly the same, the brain could have no cognisance of the difference.

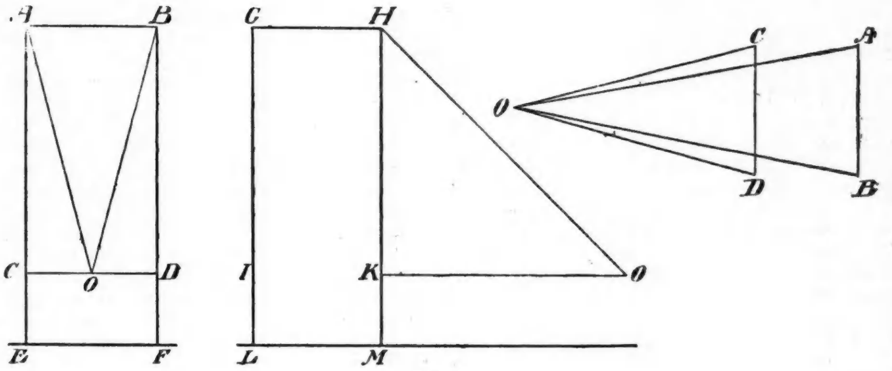


Fig. 1.

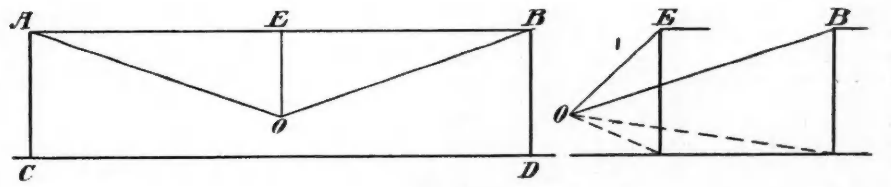


Fig. 2.

It follows, from this inability of our eyes, taken singly, to measure the distance of points from themselves, that one eye cannot tell us the form of an object. If, for instance, you take a simple form such as a cube, and look, with one eye, say, at an angle of it, you cannot see that the three plane faces you look at are squares; you may guess that they are so because it is a commoner form than a lozenge, but that is another matter; for all your eye really sees they may be lozenges of almost any length; or the four sides of each plane may be unequal, but so long as they meet on particular rays the image seen by the eye will remain the same.

Now, our science of linear perspective is based on this inability of the eye to detect distance. It assumes that a man has but one eye, or at least uses but one, and that, if he cannot tell where the points that make up the outline of the object looked at are situated on the several rays that bring the images of them to him, then we may, as it were, deceive him and place those points anywhere on the rays that we choose. We generally prefer to draw on a plane surface, and therefore we imagine the points so situated that they would all lie in a plane surface. All our rules are merely directed to finding out where each ray would cut that plane surface. Drawings made in this way, with accuracy, are scientifically correct representations of what we should see with one eye from a certain spot, but they are in no sense, of course, what we see with both eyes, for the image of every point is conveyed, by separate rays, to each eye, and its position is thereby fixed for us beyond the possibility of doubt. Neither eye can suppose it situated anywhere but where it is, because the uncertainty of each is corrected by what is seen by the other.

The condition, therefore, which enables us to make a correct drawing of what we see with one eye is absent when we take both eyes into account. If we attempted to make a section of the rays in this case, every point of the object would have to be represented by two points; otherwise it must look wrong to one eye at least, if not to both.

The impossibility of drawing what is seen with both eyes may, to some extent, be demonstrated by a very simple experiment. Hold up an object, say a pencil, about in a line with some more distant object, such as a pole or rod; look steadily with both eyes at the rod, and you will see two pencils; squint and look at the pencil, and you will see two rods. How will you draw the pencil and the rod? Shut one eye, and you see quite clearly what to draw.

There are two more points to be noted about binocular vision, both of which illustrate the impossibility of making a drawing of a solid object which will be correct for both eyes. The first is, that there are always parts of such objects which can only be seen with one eye. For instance, if you hold up a book in front of your face with the back towards you, each eye sees one of the covers which is not visible to the other, and, whether you draw one or both or neither, the picture will be wrong for one or both eyes. The other point is that, although a part of a solid object,—usually the greater part,—can be seen by both eyes, an entirely different view of it is seen by each. In the same experiment the back of the book is seen by both eyes, but each sees a different view of it which, if drawn, would be wrong to the other. This experiment presents, of course, merely an extreme case of what occurs, to some extent, with every solid object we look at, though usually it is in a much smaller degree.

With respect to the vanishing of vertical lines, there can be no sort of doubt that, as we look at them, we see them vanishing, both upwards and downwards; and so with horizontal lines at right angles to the axis of vision, or, to use a perspective term, horizontal lines parallel to the plane of the picture. Such lines also seem to vanish both ways.

Let A, B, E, F (fig. 1) be the front elevation of a tower, and G, H, L, M its side elevation, and suppose O to represent the position of a person's eye, then he would see the top angles of the tower by means of the rays A O, B O, and the points at the sides of the tower, just opposite to him, by means of the rays C, O, D, O.

Now project these two pairs of rays on a plane, and suppose this person to be judging of the width of the tower at the top, and also immediately opposite to him, remembering that the eye only sees direction. A and B must appear closer together than C and D, for they appear to be between C and D; that is, the top of the tower must appear narrower than the part immediately opposite to or nearer the eye. This is expressed by saying that the apparent length of a line is measured by the size of the visual angle.

Again, let A, B, C, D (fig. 2) be the front of a long building immediately opposite the eye of the spectator at O. If he looks up at E, the nearest point of the cornice, he looks along the ray, O, E; if he looks at B, he looks along O, B. Now, E and B are at the same height, but O B is much longer than O E (fig. 2), therefore E must appear higher than B, or the line E B vanishes downwards towards B. This has nothing whatever to do with a man's turning his head, as is often asserted. The result is not in any way different if he keeps his head and his eye perfectly still; except that he does not see so far, and, therefore, the diminution is not so perceptible. It is simply due to the fact that a line of a certain length at a distance subtends a smaller visual angle than a line of the same length nearer to the spectator. The base of the triangle, in fact, remains the same, but, the sides being longer, the angle contained by them is more acute. To say that, when a man moves his head to look at a thing, he alters his horizon line or vanishing points, or anything else of the kind, and that that is the reason certain lines seem to vanish, is to say that the laws of perspective govern those of vision, which is absurd. Leaving out of account a slight change in the position of his eyes, what he sees when he turns his head is exactly what he would see if he held it still, if only his eyes had sufficient range. The vanishing depends only on the positions of the points looked at, and the position of his eyes, not in the least on the direction in which he looks.

Of course, if lines parallel to the picture plane seem to vanish in one direction, they must seem to vanish in both; that is, vertical lines seem to vanish downwards from the point nearest to the eye as well as upwards from the same point, and horizontal lines seem to vanish to the left as well as to the right. In fact, in any two parallel lines the points nearest to the eye must look farther apart than any similar pair of points farther away, because the rays from them contain a larger visual angle, and if we could project the rays on to one plane, the further pair of points would certainly appear to be between the nearer ones.

In the horizontal cornice, therefore, the line appears to vanish to the horizon on both sides of the spectator, and, as we see no angle in the middle, it might easily be concluded that it does not vanish in a straight line, but in a curve of some sort. At first sight it seems impossible that it should be otherwise. But it must be remembered that the line we are looking at, however much produced, never would really meet the horizontal plane. The appearance of meeting is due to the deficiency in our eyesight before referred to, namely, that the eye, as a piece of mechanism, can only tell us the direction of a point, and not its distance from us. If it were otherwise, we should see exactly what exists, and there would be no question of appearances. If, once more, we think of the rays which carry the picture of the cornice line to the eye; we see that they will all lie in a plane surface, in which the line itself and the centre of vision of the eye are also situated; and the appearance of the line is exactly the same as the appearance of that plane surface would be, because the line is a part of the plane surface. It is like looking at the edge of a sheet of paper from a point in the edge. The horizontal plane is another similar plane, also passing through the centre of vision, and meeting the first in a straight line; as one leaf of a sheet of writing paper meets the other at the fold. As the eye is situated at a point on this line, and looks round at what it can see of these planes, namely, their thickness or section, always, of course, a straight line, the farther the eye looks to right or left, the nearer the planes appear to approach each other, until at 90° on each side they seem to meet.

Thus we seem to see parallel straight lines meeting at both ends, or that would meet if produced, which is a thing that cannot exist and cannot be drawn on a plane surface.

It can, however, and must, be represented on a spherical surface if such a surface is used. The early masters of perspective, the architects and painters of the Renaissance, were especially fond of exercising themselves in that way, by painting architectural features on domes in such a way that, standing in the centre under the dome, the drum seems to be lengthened upwards, or the surface of the dome disappears, and other buildings, usually very magnificent ones, seem to be seen surrounding the opening. Even Correggio had the bad taste to do something of the sort in the cathedral at Parma, and innumerable more dreadful instances by lesser masters are to be found, as you know. The process is quite simple, and the rules of plane perspective can be used, the base line in plan being made a circle, struck from the station point, and the heights being measured vertically, and not on the spherical surface.

A perspective drawing may, of course, be equally well made on any surface, mechanical facilities for execution being neglected. I mean, theoretically, it may just as well be made on one surface as another. Circular panoramas are drawn on cylindrical surfaces, merely in order to get a more extended view into the picture without apparent distortion.

The process of making a drawing on a cylindrical surface is similar to that described for a spherical one, and indeed it is the same for any surface, remembering that, in setting out on plan, the picture plane must be of the same plan as the surface drawn on, and that, in setting up heights, they must always be set up vertically, finishing, of course, on the picture plane. It is to be remembered also that the lines of the drawing are what is called a conical projection of the lines of the object on the surface of the picture; and that they will not be straight lines when projected on curved surfaces.

If we leave theory and come to practical matters, the question presents itself,—can we make any alterations in the science of perspective, as it is now understood and practised, that will be an improvement, in the sense of enabling us to represent, by any scientific process, more exactly what we see? I believe there are many persons who still believe that to be possible, notwithstanding the fact that no advance has been made since Dr. Brooke Taylor first clearly enunciated the true principles of plane perspective, and put it upon a firm scientific basis in his book published in 1715. Dr. Priestley in 1770 said, respecting this matter. "Of all the imitative arts this of perspective . . . . has actually been brought the nearest to perfection . . . . as much is known as we can imagine will ever be made use of."

A few years later, in 1779, Thomas Malton, in his well-known treatise, made a very explicit declaration on the subject. He said, "I maintain that all which can be done by rule is (he means 'has already been') performed on the most perfect and infallible principles that can be devised; that perspective is absolutely at its *ne plus ultra.*"

I firmly believe that no improvement is possible, and that every one who examines the subject more than very superficially will come to the same conclusion. The limitations of our science of perspective seem sufficiently serious when stated in words. It only enables us to draw what we see with one eye, stationed at one particular spot; and, still worse, the picture itself, to be seen correctly, must also be looked at with one eye, stationed at one particular spot. In practice these are not such serious matters, for our eyes are not very fastidious or ready to discover small inaccuracies, and memory and imagination often come to their aid when looking at a perspective drawing, and correct many of the errors that a trained eye would otherwise detect. But yet it is obviously worth consideration whether or no these defects could be overcome.

Binocular perspective we have already examined, and found that to draw things as we see them with two eyes is quite impossible. The next point is not worth examination, for, obviously, we see a different view of a solid object every time we shift the point from which we look at it; and, equally obviously, we can only draw one view at once on a flat surface.

The possibility of removing the remaining defect, namely, that a perspective drawing must be looked at by one eye stationed in a particular spot, is worth a trifle more consideration, if only because it is so often asserted that the use of a curved picture plane would overcome it. Every writer on perspective has pointed out what I have already referred to, namely, that all our rules are merely directed to finding out where the rays which carry the image of an object to the eye would cut the surface on which we draw, if we held it up between the eye and the object, and the rays could pass through it. The fact that a section through those rays looks the same as the object itself is the very foundation of perspective science. We begin by making a plan of the rays and of the surface to be drawn on; that plan enables us to see where certain of the rays would cut the surface. If we are going to draw on a flat piece of paper, of course the plan of the paper will be a straight line; if on the walls of a circular room or on a dome, the plan of the circular or domical surface will be circular; but to draw the plan of a flat piece of paper as a circle will, obviously, get us into considerable difficulties, and, however we overcome them, the result cannot be right. It must not, however, be forgotten that it is impossible to make persons look at a drawing with one eye and from one particular point; and that, when looked at from any of the other possible points (which are a great many times more numerous than the single right one), any and every drawing will be more or less wrong. It is a legitimate question, therefore, whether by sacrificing absolute correctness as regards one point of view we could not get more nearly correct (or, at least, less wrong) as regards all the other points. I am inclined to think we could do so, but it would be at an expenditure of time and labour very much greater than the advantage gained. All that is necessary is, to treat our drawing on the flat paper as a development of the drawing we should get on a spherical surface. We must use, of course, a circular picture plane in the plan, and circular height lines of various diameters, according to the points at which they cut the sphere, and very nearly all the lines that are straight in the real object will, of course, become developments of circular arcs,—that is, eliptical,—so that the labour of making such a drawing would be colossal.

The rules of perspective are so perfect that, if only means could be found to make people look at a drawing from the right point of view, no distortion would be apparent, however much the picture were extended. We all know the rule that the picture must be confined within a visual angle of 60°; and the reason usually assigned is the right one, namely, that it is all the eye can conveniently grasp at once. A person always wants to grasp the whole of a picture at one view; and he gets far enough away from it to do so. If we have drawn more than is contained in that angle, no one will look at our picture near enough to see it properly. I would add, as equally important, that we should always draw as much, at least, as will be contained in a visual angle of 45°, and with a similar object, namely, to induce the spectator to go far enough off. I believe that one very important condition of success, in making a perspective drawing, is to arrange matters, as far as possible, so that any one who looks at the drawing will be inclined to look at it from somewhere about the right point of view. A good deal may be done in this way without in the least affecting the grouping of the picture or the choice of the point of view. Besides the suggestion already made, I would propose that the picture plane should always be arranged somewhere about from 1 ft. 6 in. to 2 ft. distant from the station point in plan, because that is the most convenient distance for looking at a drawing that is neither very delicate nor very large and coarse.

Another thing that should always be arranged is to get the point of sight absolutely opposite the centre of the picture in plan; it is very easily done, and interferes with nothing. In ninety-nine cases out of a hundred, people hold a drawing exactly opposite to them in looking at it, and not on one side or the other. I always commence setting out a perspective drawing in this way:—Taking the plan, I choose a station point at the spot from which I judge the building will look best or be most seen; the rule about twice the height of the nearest angle is not of much practical use; experience, or, failing that, common sense, is a far better guide. I then make up my mind how much of the object I want to get into my picture, and draw lines from the extremities to the station point; then I find the visual centre of the picture by bisecting the angle; then measure the angle, and, if it is less than 45° or more than 60°, I shift the point a little nearer to or further from the object; always along the central ray. When all this is settled it is time enough to think about the picture plane. As far as the view of the object is concerned, this may be anywhere and at any angle, it will not affect the view at all; but, in order to get people to look at the picture from about the right point, I draw the plane at from 1 ft. 6 in. to 2 ft. from the station point, as nearly as the required size of the future picture,—if any size is specified,—will allow; and always absolutely at right angles to the central visual ray; because then the station point is opposite the middle of the picture, where any one naturally stands to look at it. There is only one more matter that I will detain you by noticing. It is in connexion with vertical lines and other lines parallel with the picture plane. I claim no originality for my theory that such lines appear to vanish, but I shall be disappointed if I find I have failed to show quite clearly that they do so. "Well, if they appear to vanish," I can imagine many people asking, as I have been asked dozens of times before,—"Why not draw them so?" The answer appears to me perfectly clear and conclusive. In Mr. Burchett's words, it is this,—"The appearances of the representations of objects are subject to the same optical laws as the appearances of the objects themselves"; that is, if two lines in an object, which are really straight and parallel, appear to vanish, then the representations of those lines on a sheet of paper will only appear to vanish in the same way if they also are really straight and parallel. There is not one optical law for the appearance of a straight line on a building and another optical law for the appearance of a similar straight line on a sheet of paper. If A, B, C, D (fig. 3) represent the face of a tower seen from E, and A^1, B^1, C^1, D^1 represents the perspective view of it on a sheet of paper; then the visual angle, A, E, C, is the same as the visual angle A^1, E, C^1; therefore the apparent length of A, C is the same as the apparent length of A^1, C^1. For a similar reason the apparent length of B, D, is equal to the apparent length of B^1, D^1, and the lines B^1, A^1, and D^1, C^1, will appear to vanish to exactly the same extent as the lines B, A, and D, C. With reference to this same point, some people contend that, because a sphere always appears to the eye to have a circular outline, therefore it should always be drawn as a circle. That is far from being the case, for, if it were so drawn on a plane surface, it would only appear circular to the eye when exactly opposite the point of vision,—a circle which is not just opposite the eye will always appear an ellipse, and, if you want the appearance of a circle you must draw an ellipse.

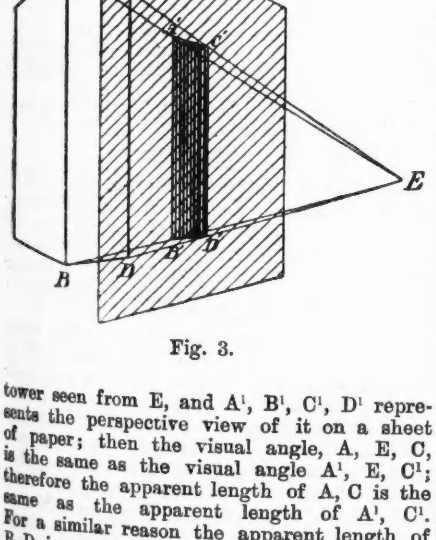


Fig. 3.

In conclusion, I may say that I do not regard this subject as of purely theoretical interest. To every draughtsman and sketcher and designer I believe a knowledge not only of the rules of perspective, but of what the eye or eyes are likely really to see, is of the utmost importance in enabling him, for one thing, to tell what his eyes do actually see. A sketcher, ignorant of such things, has to fumble and try again and again before he can make his lines fit one another and appear correct, for it is almost impossible for such a man to find out what he does really see. It enables the designer to know far more accurately what his designs will look like when executed. "Nothing," says Dr. Brooke Taylor, "ought to be more familiar to a painter than perspective, for it is the only thing that can make the judgment correct and will help the fancy to invent with ten times the ease that it could do without it."

It is only a minor advantage that an exact knowledge of the subject will prevent draughtsmen from wasting time and perhaps spoiling their drawings, by trying to do what is impossible or wrong.

I will end with a quotation from the work of Thomas Malton. He says that "perspective is allowed by all who are well acquainted with it to be the basis of all the polite arts which have their foundation in drawing."

Mr. W. H. Atkin Berry, in opening the discussion, said that Mr. Baggallay had shown how much science and mystery underlay the rules they were in the habit of using for everyday perspective. It was, he thought, fortunate that a sort of rule-of-thumb process existed which enabled them to make perspectives without having a thorough knowledge of all the underlying theory. He confessed he was still in the dark as to the theory of the vanishing of vertical lines. He had often asked himself how it was that lines drawn vertically upon the paper appeared correct, if they should theoretically be made to vanish? Then, again, a tower or column *built* with perfectly vertical sides did really *appear to widen* at the top. That brought them to the matter of the diminution of columns, which was done for the purpose of getting over the *apparent* widening of the mass as it extended upwards. That fact seemed contradictory to the theory of vertical lines vanishing upwards. Supposing, also, a tower to be drawn with perfectly upright sides, and with no attempt to make them vanish, on looking at the drawing with one eye, at the actual distance to scale of the station-point, the lines would appear as they would in actual execution, showing that it was needless to provide for the upward vanishing. As to the distance of the station-point from the picture-plane, no doubt theoretically it might be desirable to fix a distance of 1 ft. 6 in. or 2 ft., but it seemed to him it must so much depend upon circumstances that it would be almost impossible to adhere to such a rule. They could not tell from what distances their pictures would be seen. If exhibited in the Academy they might by good fortune be hung "on the line," or they might be "skied," while the drawings might be of large or small buildings. He had found the best way of choosing distance from an object was to fix the station-point at an angle of about 48 or 50 degrees away. Then he would regulate the picture-plane entirely by the size of the drawing required, and not bother himself about the distance from which it *might* be viewed. Did he understand Mr. Baggallay to say that a sphere in perspective should be made like an ellipse?

Mr. Baggallay replied that he had meant to say that a sphere always looked to the eye circular in outline, but when drawn on a flat surface it must usually be drawn as an ellipse.

Mr. Berry continued that he did not doubt the accuracy of the statement, but he should have to think it over. He concluded by proposing a hearty vote of thanks to Mr. Baggallay for a paper from the perusal of which the members could not fail to derive great benefit.

Mr. F. R. Farrow said the difficulty brought forward by Mr. Berry arose from the fact that Mr. Baggallay had taken the view of the effect produced on the retina by the rays of light, but had not told them that they really saw with the brain, and not with the eyes. The images formed on the retina were quite distinct from the impression produced in the brain when looking at an object. Most of those who had studied optics would know that the retinal image appeared on the retina reversed, but it was not seen in that position, because it simply conveyed an idea to the brain of what was seen. If, then, it was borne in mind that sight depended on the brain and not upon the eye, they would at once understand how vertical lines did not appear to converge in reality. When looking at a tower, the top did not appear to be narrower, but appeared wider than the bottom, that being the correction made by the brain, acting on past experience, and overcoming the theoretical effect. The view was, therefore, right that on the image on the retina the top of the tower would be narrower than the bottom. In looking at a photograph taken by a lens not specially adapted for counteracting that tendency, it would be seen that the lines did tend upwards. The tower would appear narrower at the top than at the bottom, because the camera was simply acting in the same way that the eye acted in producing the retinal image. Mr. Baggallay had said that one eye could not tell the distance of an object, but that was hardly true in its entirety, because the notion of distance was arrived at not only from the view got from the convergence of the two eyes, but also from the past experience of how lines tended towards the horizon. On looking at a horizontal cornice the point nearest to the eye would seem higher than the point furthest away, so that in looking at it with one eye the same effect would be got of horizontal lines tending towards the horizon, and not appearing perfectly horizontal. Mr. Baggallay had also referred to the fact of two eyes being necessary not only for telling the distance, but also the solidity of an object. No doubt that was the case regarding near objects, but when they were far off it was by inference from past experience, and not by the eye, that their solidity was known.

After a few remarks from Mr. H. O. Cresswell, not reportable on account of their reference to blackboard diagrams,

Mr. H. W. Pratt said he believed the subject had been treated some years ago before the Association. As to the distance of the spectator being 1 ft. 6 in. or 2 ft., a considerable amount of judgment was necessary in the matter. He was inclined to recommend that in preparing perspectives of a certain size the plan should be made to the right scale instead of attempting to get what would become a picture out of all proportion or distorted. It seemed a pity in drawing street architecture that the station-point was not put near the picture, because, although it was nice to see an elevation in a narrow street as though it could all be seen, yet it did not give a true idea of the building itself as actually seen. In drawing such an object as a spire in perspective, they should, he thought, always curve the lines, so as to form an entasis on paper as well as in the actual building of it, otherwise the lines would not appear to be straight, but rather to go in at the sides. Mr. Pratt congratulated Mr. Baggallay on the excellent paper he had given, and concluded by seconding the vote of thanks.

Mr. A. O. Collard said that Mr. Baggallay appeared to have mostly dealt with such work as the illustrations in the journals, which was the sort of work to which architects generally confined themselves, pictures "on the line" at the Academy being rather beyond their scope. Perspective, although a most admirable acquirement in their professional work, was somewhat overrated by architects themselves, while the public, on the other hand, were distinctly suspicious of architectural perspectives. Architects were naturally very much prepossessed in favour of the buildings they designed, and wished to see them carried out, and in putting perspectives of them before their clients they were always taken from the very best points, and possibly where the buildings, as was often the case in London, could hardly be seen at all. Then, again, architects were fond of putting some big buildings on the wrong side of the perspective and in that way creating an impression that the building was much finer than it really was. That was what was vulgarly termed "faking-up" (laughter).

The Chairman said the meeting had listened with great attention to Mr. Baggallay's able paper, and many of them would read it with even greater interest, because he believed they were, like himself, in Mr. Berry's position of not being able to follow the whole of it. The question of the vanishing of vertical lines was a curious one. A most difficult question was that of single vision with two eyes. There was no doubt that on each retina there was a distinct image formed of the thing looked at, and yet practically one object only was seen. Mr. Farrow was quite right in saying that the retinal image was reversed, and that it was an act of the brain which enabled one to see the object the proper way up. In looking at any particular point with one eye it was difficult to say how far off it was in a direct line, and even with two eyes it was often impossible to state the distance of such a thing as a wire stretched horizontally. There was nothing one was more likely to do in walking across a field, with a wire fence, than to run against that.

The vote of thanks was then put, and was very cordially received.

Mr. Baggallay, in replying, said that on every disputed point he was ready to maintain his position. As to the vanishing of vertical lines, he had said that they could see them vanish with their eyes, and when they drew lines on a sheet of paper they saw them also vanish, exactly in the same degree as the vertical lines in nature vanished. In the case of columns, entasis was not given to counteract the tendency of a vertical object appearing to spread. Those who invented entasis took a tip from nature. In trunks of trees, limbs of animals, &c., the point where they were attached to something solid was thicker than the other end. The thinning did not occur in a straight line, but in a curve, and that natural peculiarity was imitated when entasis was given to columns. He had not been able to see that the top of a tower or of a column, however high, looked wider than the bottom. People said it did, and he must try and believe it; but he had never himself been able to detect it. The point on which he was weakest was the making of the plane 1 ft. 6 in. or 2 ft. from the point of sight, but that was only a rough sort of estimate, and if Mr. Berry made his drawings to be hung on the walls of the Academy, he had better take a little longer distance (laughter). What he had meant to convey was, that the point of sight should not be taken too close. The work going on between the retina and the brain was a difficult subject. He did not agree with Mr. Farrow's theory, but he was not prepared to prove that it was wrong. He did not see how the brain could arrive at any conclusion, except through the retina, on what it saw at the moment. Memory might help to correct what the retina stated to the brain, but as far as what was seen at the moment was concerned, he could not believe that the brain had any knowledge except from what the retina told it. As to seeing objects upside down, it had been clearly explained by the fact that though seen in that position, their appearance relatively to one another was exactly the same as if they were seen the right way up. Mr. Pratt had referred to a paper on the same subject read some years ago, and he (the speaker) had already given the date of it,—viz., November 24th, 1876. They might find an explanation of what Mr. Slater had said about the wire in the fact that it was very much in the plane of the eyes, and there was little or nothing around or about it to compare with it or to show its position.

CASE UNDER THE METROPOLIS MANAGEMENT AND BUILDING ACTS (AMENDMENT) ACT, 1882.

TEMPORARY STRUCTURES.

On Friday, December 1st, at the Wandsworth Police Court, before Mr. Paget, John Foster, of 5, Mount Pleasant, Merton-road, Wandsworth, was summoned by Professor T. Roger Smith, District Surveyor of West Wandsworth, for having erected at 5, Mount Pleasant a wooden structure of a movable or temporary character without having obtained the licence of the Metropolitan Board of Works, required in accordance with Section 13 of the above-named Act. Mr. Barnard appeared for the complainant, and Mr. Bell for the defendant.

The structure complained of was erected in the forecourt of the house; was 17 ft. long, 7 ft. 5 in. wide, and 8 ft. high; and formed a lean-to addition to the house, and was used as a shelter for goods exposed for sale. It consisted of wooden rafters supported by two horizontal timbers, one fixed to the wall of the house, and one carried by three wooden posts standing in sockets let into the ground. The roof was of canvas laid on the rafters. The front and two ends were open, and to the posts in front was fixed a tradesman's signboard.

On behalf of the District Surveyor it was contended that this was a wooden structure of a movable or temporary character, and that the licence of the Metropolitan Board of Works should have been obtained for its erection.

For the defendant this was disputed, on the ground that the structure was set back some distance from the road; that the construction was very slight; that no part was fixed; and that the whole could be removed in a few minutes.

The Magistrate held that it was a structure to which the requirements of the Act applied, and that no licence having been obtained for its erection, he must order it to be removed.

SALT-WATER FOR STREET-WATERING.

Sir,—Your correspondent's experience is interesting, but engineers will distinguish between his facts and his theory.

It is obvious that the inconvenience he describes [p. 788, *ante*] is not the fault of the salt-water. On the contrary, frost is much less liable to injure the road watered with salt-water than that watered with fresh-water, as it rarely happens in England that the frost is severe enough to freeze salt-water at all, especially at some inches under the surface.

As regards the phenomena observed after "soaking rain," they are also without doubt wrongly attributed to the salt, as salt does not "heave," *i.e.*, I suppose, expand when wetted, as any one may easily prove for himself.

H. D. Pearsall, C.E.

BIRMINGHAM, DUDLEY, AND DISTRICT BANKING CO. *v.* ROSS.

Sir,—We think your editorial remarks upon this case, in your issue of the 26th ult. [p. 728], are somewhat misleading. The buildings are not upon adjoining sites; they both front a main street, but between them, and at right-angles to the main street, is a public thoroughfare, 20 ft. wide, called Warwick-passage. This passage was designed and laid out at the time the lease of plaintiffs' property was granted, and their buildings were designed and built with numerous windows facing to it, with full knowledge that a building would be erected on the opposite side of the passage as soon as the land could be let.

Mr. Justice Kekewich did not alter the rule of law, that a man cannot derogate from his own grant, but followed a dictum of Lord Justice Cotton in a previous case, to the effect that an implied grant could be qualified by circumstances in the knowledge of the grantee at the time of the grant, and held that the plaintiffs' predecessor in title knew that a building would be erected on the opposite side of Warwick-passage; that the defendant's building was not an unreasonable height; nor, having regard to the locality, higher than might have been anticipated when the plaintiffs' lease was granted.

This decision seems to us in accordance with common sense, but we understand the plaintiffs will appeal.

Dempster & Heaton
(Defendant's Surveyors).

Birmingham, December 6, 1887.

"ST. AUGUSTINE AT ST. ALBAN'S ABBEY."

Sir,—Referring to a letter from Mr. Hems [p. 788], embodying part of another from Mr. Hucks Gibbs, published in your issue of last week, and relating to the question as to whether Augustine, the missionary, has a just claim to the title of "saint," Mr. Hucks Gibbs writes to say that my quotations from Mr. Surtees "amount simply to this, that Wheatly, writing in the last century, said what was quite true, that Pope Gregory sent Austin the monk to England (obviously Austin was not then canonised). . . . ."

This he seems to consider as in some mysterious way an argument in favour of his subsequent canonisation, and apparently considers that though the best writers on English church history term him Augustine only, as Mr. Surtees remarks, and I will add also the best of writers on English history, all these authorities are valueless, Augustine not being canonised at the time to which they refer. When, however, authors of the twelfth century, and later, are found sedulously bestowing the title on St. Gregory, and as carefully withholding it from Augustine, I think this argument is proved to be of little service.

I quote the following to substantiate my statement:—

"In the meantime Augustine was sent by Pope St. Gregory into Britain."—Jeffrey of Monmouth, of the twelfth century; Thompson's translation, 1718, p. 367.

"St. Gregory commissioned the servants of God, Mellitus, Augustine, and John, with several others who feared the Lord, to preach to the English nation." — "Ordericus Vitalis" of the twelfth century, Forester's translation, 1853, pp. 347-8.

"St. Gregory . . . . appointed Austin, or Augustin, a monk of the convent of St. Andrew's at Rome, with forty other monks, to go into England, ... they made a stop, and sent back Austin their leader, to represent these difficulties to St. Gregory."—Henry's "History of England," 1774, vol. ii., p. 136.

In conclusion, let me remark that one satisfaction is, at any rate, ours. If the nimbed figure is a mistake, it will not in any degree equal in symbolical inaccuracy that of Mr. Cottingham's lady bishop at Rochester.

H. Littlehales.

"STATUS OF SANITARY INSPECTORS."

Sir,—I was glad to see in your issue of last week [p. 788] Mr. W. J. Addiscott's letter anent the status of Sanitary Inspectors, and more especially that part of the letter which dealt with the Sanitary Institute examination, and the hardship which provincial candidates have to undergo in competing with those who reside in or near London, and thus are able to attend the lectures, while the provincial candidate, let him be ever so willing, is unable to do so unless at considerable expense.

Another hardship which they have to undergo is in the fact that the examinations are always held in London, and thus they have to incur considerable expense compared with their London brethren; for instance, in my own case, should I go up for the examination, my railway fare alone would amount to over 3*l.*, and, together with the fees for examination (which are ridiculously high), hotel expenses, &c., would bring the sum total to between 12*l.* and 14*l.*, not to mention loss of time, &c.

Why cannot the Sanitary Institute hold an examination in the North of England, as they hold their congresses, and thereby bring it nearer the doors of Scotch and North of England candidates? I am certain that if the Institute could only see it in their power to do so, they would confer a great boon on candidates in the North, and materially add to the number of candidates.

Robt. A. Wilson.

Lee Mount House, Burntisland.

DEODORISING WATER-CLOSETS.

Sir,—Herewith I send you a simple method of deodorising a w.c. when supplied with water from a separate cistern. I have tried it for three months, and it answers very well.

Take a bottle about 5 in. deep if for a flushing cistern, or larger for a supply cistern. Such bottles as those used for citrate of magnesia are the best. Fill it with permanganate of potass, cork it securely, bore two holes in the cork with a large pin, then suspend it upside down in the cistern by a string or wire passed round the neck and bottom of the bottle and tied to a piece of wood across the top of the cistern or to a hook hooked over the side. The bottle should be covered by the water when the cistern is full. This arrangement will cost 3d., and last five or six months. It will keep the water charged with permanganate in proportion to the time that elapses between each discharge of the closet or the number of holes in the cork.

Henry Ough.

THE RECENT MEETING OF SANITARY ENGINEERS AND SURVEYORS AT LUTON.

Sir,—The reference in the paper read by me [see *Builder*, p. 696, *ante*] relative to the trial of the Native Guano Company's process was, I regret to say, made in error.

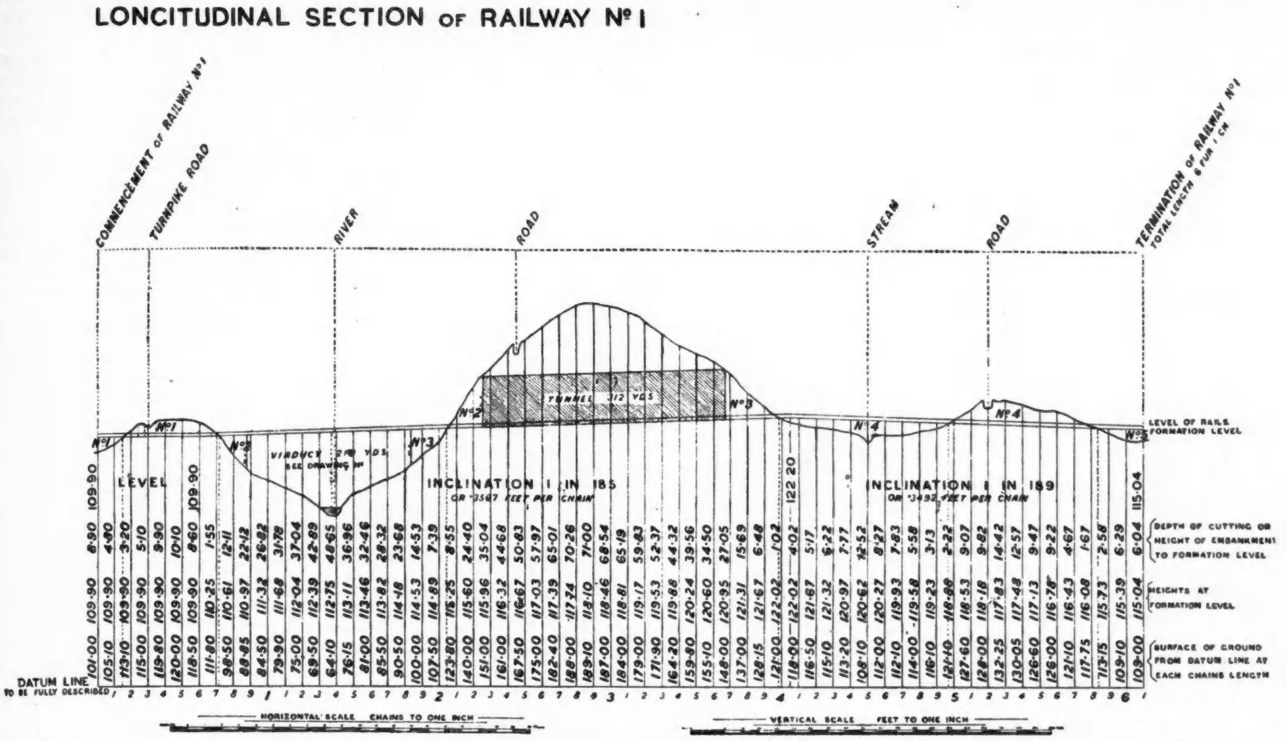
W. H. Leete, Borough Suveyor.

Luton, December 3rd.

Royal Institution of Great Britain.—Mr. Hubert Herkomer, A.R.A., Slade Professor of Fine Art in the University of Oxford, will deliver three lectures at the Royal Institution early next year, viz., Jan. 19, "The Walker School"; Jan. 26, "My Visits to America"; Feb. 2, "Art Education."

Trade Smoking Concert. — The third annual smoking concert of the office staff of Messrs. Wm. Brass & Son, builders, and their friends, was held on Saturday evening in the large dining-saloon of the Falstaff Restaurant, Eastcheap. Over 300 persons were present, including representatives from many other building firms. Mr. R. Fraser was in the chair, and Mr. G. Bland in the vice-chair. Mr. A. Cox was the accompanist at the pianoforte. The programme was diversified. The concert was under the management of Messrs. W. Arnold, C. R. Crispin, W. R. A. Hughes, and Mr. G. W. Norris (hon. sec.).

LONGITUDINAL SECTION OF RAILWAY Nº 1


COMMENCEMENT OF RAILWAY Nº1
TURNPIKE ROAD
RIVER
ROAD
STREAM
ROAD
TERMINATION OF RAILWAY Nº1 TOTAL LENGTH 6 FUR 1 CH
TUNNEL 312 YDS
VIADUCT 210 YDS SEE DRAWING Nº
Nº1
Nº1
Nº2
Nº2
Nº3
Nº3
Nº4
Nº4
Nº5
LEVEL OF RAILS
FORMATION LEVEL
LEVEL
109·90
109·90
INCLINATION 1 IN 185
OR ·3567 FEET PER CHAIN
122 20
INCLINATION 1 IN 189
OR ·3492 FEET PER CHAIN
115·04
DATUM LINE
TO BE FULLY DESCRIBED
HORIZONTAL SCALE CHAINS TO ONE INCH
VERTICAL SCALE FEET TO ONE INCH

	DEPTH OF CUTTING OR HEIGHT OF EMBANKMENT TO FORMATION LEVEL	HEIGHTS AT FORMATION LEVEL	SURFACE OF GROUND FROM DATUM LINE AT EACH CHAINS LENGTH
	8·90	109·90	101·00
1	4·90	109·90	105·10
2	3·20	109·90	113·10
3	5·10	109·90	115·00
4	9·90	109·90	119·80
5	10·10	109·90	120·00
6	8·60	109·90	118·50
7	1·55	110·25	111·80
8	12·11	110·61	98·50
9	22·12	110·97	88·85
1	26·82	111·32	84·50
1	31·78	111·68	79·90
2	37·04	112·04	75·00
3	42·89	112·39	69·50
4	48·65	112·75	64·10
5	36·96	113·11	76·15
6	32·46	113·46	81·00
7	28·32	113·82	85·50
8	23·68	114·18	90·50
9	14·53	114·53	100·00
2	7·39	114·89	107·50
1	8·55	115·25	123·80
2	24·40	115·60	140·00
3	35·04	115·96	151·00
4	44·68	116·32	161·00
5	50·83	116·67	167·50
6	57·97	117·03	175·00
7	65·01	117·39	182·40
8	70·26	117·74	188·00
9	71·00	118·10	189·10
3	68·54	118·46	187·00
1	65·19	118·81	184·00
2	59·83	119·17	179·00
3	52·37	119·53	171·90
4	44·32	119·88	164·20
5	39·56	120·24	159·80
6	34·50	120·60	155·10
7	27·05	120·95	148·00
8	15·69	121·31	137·00
9	6·48	121·67	128·15
4	1·02	122·02	121·00
1	4·02	122·02	118·00
2	5·17	121·67	116·50
3	6·22	121·32	115·10
4	7·77	120·97	113·20
5	12·52	120·62	108·10
6	8·27	120·27	112·00
7	7·83	119·93	112·10
8	5·58	119·58	114·00
9	3·13	119·23	116·10
5	2·22	118·88	121·10
1	9·07	118·53	127·60
2	9·82	118·18	128·00
3	14·42	117·83	132·25
4	12·57	117·48	130·05
5	9·47	117·13	126·60
6	9·22	116·78	126·00
7	4·67	116·43	121·10
8	1·67	116·08	117·75
9	2·58	115·73	113·15
6	6·29	115·39	109·10
1	6·04	115·04	109·00

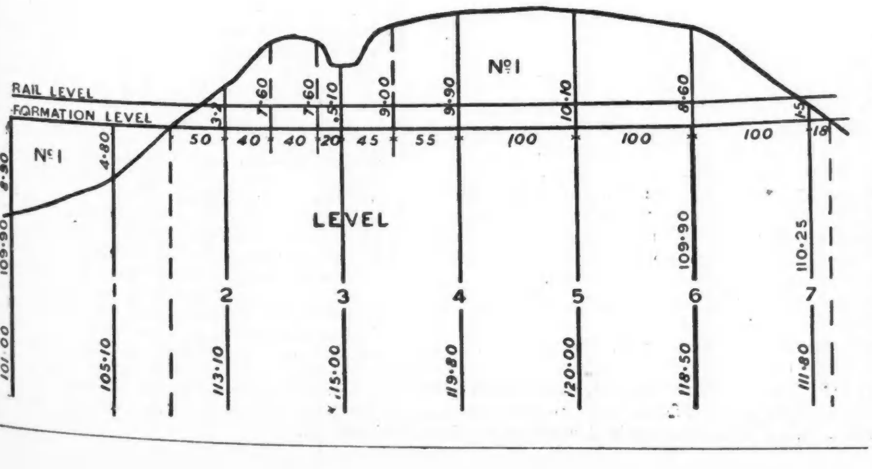
BACK SET	INTER MEDIATE	FORE SET	RISE	FALL	REDUCED LEVELS	FORMATION LEVELS	EXCA VATION	EMBANK MENT	LENGTHS	REMARKS

RAILWAY Nº 1

CUTTINGS

Nº	1 LENGTH *IN CHAINS*	2 HEIGHTS *IN FEET*	3 TABULAR Nº OF CENTRE *RED FIGURES*	4 1 × 3	5 WIDTH OF CENTRE *SEE TABLE BELOW*	6 CONTENT OF CENTRE 4 × 5	7 TABULAR Nº OF SLOPES *BLACK FIGURES*	8 1 × 7	9 RATIO TO VERTICAL	10 CONTENT OF SLOPES 8 × 9	TOTAL CONTENT CUBIC YARDS 6 + 10
Nº 1	0·50	0·00 3·20	3·7	1·85	30	55·50	7	3·50	1¼	4·37	59·87
	0·40	3·20 7·60	13·4	5·36	,,	160·80	79	31·60	,,	39·50	200·30
	0·40	7·60 7·60	19·6	7·84	,,	235·20	156	62·40	,,	78·00	313·20
	0·20	7·60 5·10	15·9	3·18	,,	95·40	105	21·00	,,	26·25	121·65
	0·45	5·10 9·00	17·1	7·69	,,	230·70	123	55·35	,,	69·18	299·88
	0·55	9·00 9·90	23·2	12·76	,,	382·80	221	121·55	,,	151·93	534·73
	1·00	9·90 10·10	24·4	24·40	,,	722·00	244	244·00	,,	305·00	1027·00
	1·00	10·10 8·60	23·2	23·20	,,	696·00	221	221·00	,,	276·25	972·25
	1·00	8·60 1·50	13·4	13·40	,,	402·00	84	84·00	,,	105·00	507·00
	0·18	1·50 0·00	2·4	·43	,,	12·90	3	·54	,,	·67	13·57
											4049·45

SLOPE OF BANKS 1¼ TO 1
SLOPE OF CUTTINGS 1¼ TO 1
EXCEPT ROCK


RAIL LEVEL
FORMATION LEVEL
Nº 1
Nº 1
LEVEL
8·90
4·80
3·2
7·60
7·60
5·10
9·00
9·90
10·10
8·60
1·5
50
40
40
20
45
55
100
100
100
18
109·90
109·90
110·25
2
3
4
5
6
7
101·00
105·10
113·10
115·00
119·80
120·00
118·50
111·80

The Student's Column.

LAND SURVEYING AND LEVELLING.

XXIII.—RAILWAY QUANTITIES.

THE diagram illustrates a working contract section for a line of railway, 6 furlongs 1 chain in length. The surface levels of the natural ground having been plotted by the method explained in our article (*Builder*, November 19th, p. 719), vertical red or blue lines are ruled upon the section at each chain's length perpendicular to the datum line. The level of the datum line having been determined, the heights of the surface levels above the datum line are then written, as shown upon these vertical lines, just above the datum

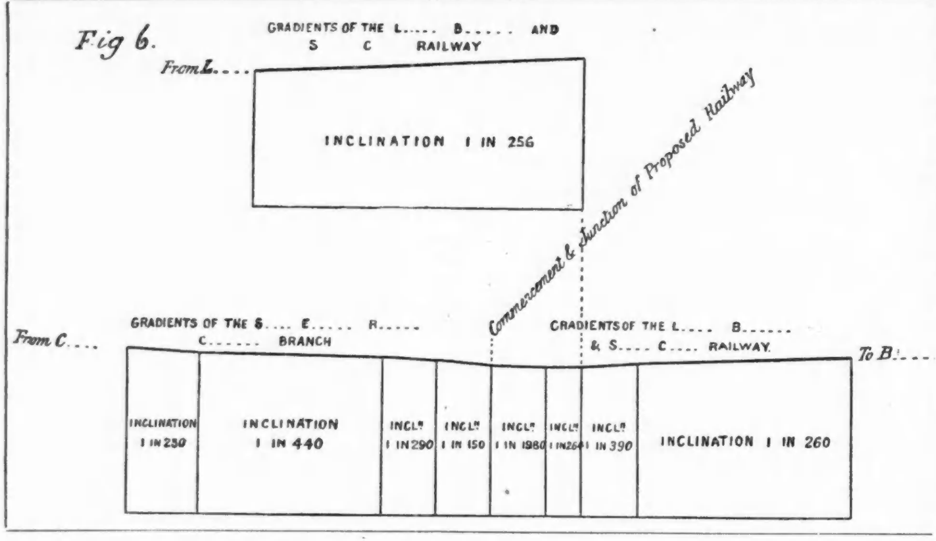


Fig 6.
GRADIENTS OF THE L..... B...... AND S C RAILWAY
From L....
INCLINATION 1 IN 256
Commencement & Junction of Proposed Railway
From C....
GRADIENTS OF THE S.... E..... R..... C...... BRANCH
GRADIENTS OF THE L.... B...... & S.... C.... RAILWAY.
To B.....
INCLINATION 1 IN 230
INCLINATION 1 IN 440
INCLN 1 IN 290
INCLN 1 IN 150
INCLN 1 IN 1980
INCLN 1 IN 264
INCLN 1 IN 390
INCLINATION 1 IN 260

line. These heights should be derived as much as possible from the figures contained in the column headed "Reduced Levels," in the "Level Book," and should be only scaled as a check upon the plotting or at points where no reduced levels are given in the "Level Book." The level of the upper surface of the rails should next be figured upon the section. This is arrived at by first "grading" the section by stretching a piece of cotton over portions of the irregular line which indicates the present level of the ground, and adapting the cotton line by successive rising or falling gradients to allow of the amounts of banks and cuttings in each case appearing equal to the eye. In so grading a section, regard must be had to what is termed the "ruling gradient," namely, 1 in 100, or such other maximum inclination as is decided to be adopted. At each change of gradient a vertical black line is drawn in between the datum line and the surface level, and the heights of the rail level scaled off the section are figured upon these vertical lines. The horizontal distance is then scaled, and the inclination of the gradient calculated. If it is desired to make the gradient so found to rise or fall one unit in a certain multiple of chains, the height of the rail level at the further end can be raised or lowered the fractional tenths and hundredths of a foot which will enable the gradient to work out to this exact number in the given distance without remainder. The levels of the rails at each chain's length, or of the "formation level," from 9 in. to 2 ft. below the level of the upper surface of the rails, is next arrived at by calculation, and figured upon the section. Thus, referring to the diagram, the difference between the heights 109·90 and 122·20 gives 12·30 ft. in a length of 34½ chains (2,277 ft.), which is equal to a rising gradient of 1 in 185 or ·3567 ft. per chain (66 ft.). Hence, if we alternately add 0·35 and 0·36 at each chain, we shall find we obtain 122·20 at a distance of 34½ chains from the point where we measured 109·90. Thus if either the rail level or the formation level (if preferred) be 109·90 at 6 chains, it will be 109·90 plus 0·35 equals 110·25 at 7 chains; and 110·25 plus 0·36 equals 110·61 at 8 chains. The upper row of figures upon the section shows the amount of depth of the cutting or height of the bank. The surface level at 6 chains being 118·50, by subtracting 109·90 from this we obtain 8·60 depth of cutting. The surface level at 7 chains being 111·80 and the formation level (or it may be the rail level) 110·25, the amount of cutting is here seen to be 1·55 as figured upon the section.

The quantities of earthwork can be most readily arrived at by the use of Bidder's tables (sold in sheets, at 2s. each or mounted 3s. 6d.). The section is headed with the number of the railway, in this case No. 1, and the banks and cuttings are each numbered in order, the banks in this section numbering 1 to 5, and the cuttings 1 to 4. A viaduct is indicated in the place of a high embankment between 9 and 18 chains and a tunnel in the place of deep cutting between 23 and 36 chains. The adoption of a viaduct or tunnel in the place of a bank or cutting is generally a question of expense, the cheapest being usually recommended, but it is also dependent upon the geological formation and the nature of the property. The diagram illustrates the application of Bidder's tables in tabulating the results.

A form of level book sometimes employed in railway work is also shown, in which columns are provided for the heights of formation levels, embankments, and depths of excavations.

Widths of roads, and the natural slopes of earths, should be thus tabulated:—

WIDTH OF CENTRE.

Occupation Roads	16 ft.
Single Line Railway	18 ft.
Ditto " "	20 ft.
Public Road	28 ft.
Double Line Railway	30 ft.
Ditto " "	33 ft.
Turnpike Road	38 ft.

NATURAL SLOPES OF EARTHS.

Table of Angles made with Horizontal Line.

Gravel, average	40°
Dry Sand	38°
Sand	22°
Vegetable Earth	28°
Compact Earth	50°
Shingle	39°
Rubble	45°
Clay, well drained	45°
Ditto, wet	16°

XXIV.—PARLIAMENTARY WORK.

The preparation of plans for Parliament connected with projected schemes having reference to railways, tramways, docks, subways, water or gas supply, and other works, is generally effected by correcting such portions of the Ordnance map as show the country which lies between the limits of deviation to be indicated upon the deposited plan. Prior to the publication of an Ordnance map, showing any particular country to be traversed, it was the custom to trace the parish or tithe map and to correct this tracing upon the ground. The minimum scale for plans to be deposited under Standing Orders is 4 in. to the mile, and the minimum scale for such portions as require to show enlarged plans of buildings is six chains to the inch. The diagram, fig. 1, shows the form of a finished plan. The numbers in each enclosure refer to the Book of Reference, and are inserted by one of the reference clerks engaged by the solicitors to the undertaking, whose duty it is to describe each enclosure, and to state the names of the owners, lessees, and occupiers in proper Parliamentary form. The rules and regulations to be observed are published under the name of "Standing Orders" of the Houses of Lords and Commons. It is the surveyor's work to see that all roads, fences, streams, buildings, county and parish boundaries, centre line of proposed work, with ticks indicating miles and furlongs, are accurately shown upon the tracing which is handed to the solicitor to reference.

An accurate plan is important, in order to make an accurate section. The section is seldom chained from end to end, but its position in open country is measured from well-defined points in the fences, and in towns from the corners of buildings shown on the plan. These measurements should be scaled off the original map, and figured upon the tracing that is to be used for setting out in the field. The minimum scale for sections to be deposited under Standing Orders is 4 in. to the mile horizontal scale, and 100 ft. to the inch vertical scale. The minimum scale for cross sections and sections of road alterations is 40 ft. to the inch. Fig. 2 shows a portion of a Parliamentary section, in which it will be observed that according to the Standing Orders the section is drawn to the same horizontal scale as the plan. The mileage and furlong points correspond with the plan. The depth of all cuttings and embankments at their deepest points over 5 ft. above or below the rail level are stated, the heights (calculated) and the inclinations of the proposed gradients are also given. Roads that are crossed upon the level, and all public roads are noted, and the method of dealing with them described (see also cross sections).

PARLIAMENTARY REGULATIONS FOR RAILWAYS CROSSING ROADS.

	Turnpike road. ft. in.	Public road. ft. in.	Occupation road. ft. in.
Clear width of under bridge, or approach	35 0	25 0	12 0
Clear height of under bridge for a width of 12 ft.	16 0	—	—
Ditto, for a width of 10 ft.	—	15 0	—
Ditto, " 9 ft.	—	—	14 0
Ditto, at springing	12 0	12 0	—
Over bridge. Height of parapets	4 0	4 0	4 0
Approaches. Inclination	1 in 30	1 in 20	1 in 16
Ditto. Height of fencing	3 0	3 0	3 0

Maximum Limits of Deviation.

In towns, 10 yards each side of centre line.

In the country, 100 yards, or 5 chains nearly.

Maximum Deviations of Level.

In towns, 2 ft. In the country, 5 ft.

Maximum Deviations of Gradient.

Gradients flatter than 1 in 100, deviation 10 ft. per mile steeper.

Ditto, steeper, 3 ft. per mile steeper.

Maximum Deviations of Curves in Construction.

Curves upwards of ½ a mile radius may be sharpened to ½ mile radius.

Curves of less than ½ mile radius may not be sharpened.

Fig. 6 shows the half-mile sections which have to be taken when a railway is intended to form a junction with an existing or an authorised line of railway. The Standing Orders state that the scale shall be the same as the general section, and that the gradients of the existing or authorised line of railway shall be given for a distance of 800 yards on either side of the point of junction.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,934, Sliding Sashes. T. Cooke and W. H. Boyens.

This invention relates to an appliance for assisting in the raising and lowering of sashes and sliding windows, and holding them in position when raised. A spring, formed of a loop-shaped metal bar, is fixed at its end either to the side of the sash or the jamb of the window, and carries in a bend formed at the middle of its limbs the axis of a barrel or hollow roller, the axis being fixed, with the barrel revolving loose upon it, between the limbs of the spring. The barrel contains a volute spring, the inner end of which is fixed to the axis, while the outer end is fixed to the barrel. Thus, assuming the barrel to be turned upon its axis so as to wind up the spring to a greater or less extent, while the barrel is pressed with its periphery against the jamb of the sash by means of the spring, it will be seen that if the sash be moved in the direction in which the barrel is rolling upon the jamb or sash, it will allow the spring to unwind; whether its direction be upward or downward, the power of the spring will assist the power of the hand in applying the motion, while in moving the sash in a contrary direction, the barrel will be rotated so as to wind up the spring again. If the sash be left in any intermediate position, it will be held there by the frictional pressure of the barrel against the jambs or sash caused by the spring.

16,809, Feed for Circular Saws. E. Hughes.

By this invention wheels and gearing are dispensed with, but the rollers generally used with the feed are retained. An endless band or chain is passed round a number of sheaves or carrying drums or rollers, and round a rotating wheel, sheave, or drum, from which it receives motion. On the bed of the machine are one, two, or more rollers, with sheaves at one end round or against which the band or chain also passes. These rollers are mounted in slots or on movable brackets, so as to be easily adjusted to the thicknesses or inequalities of the surface of the timber, and may either be tightened into position or left loose so that the weight of the chain or band will hold them with sufficient force against the timber to feed it. The brackets are somewhat in shape like "lazy tongs," to allow for adjustment.

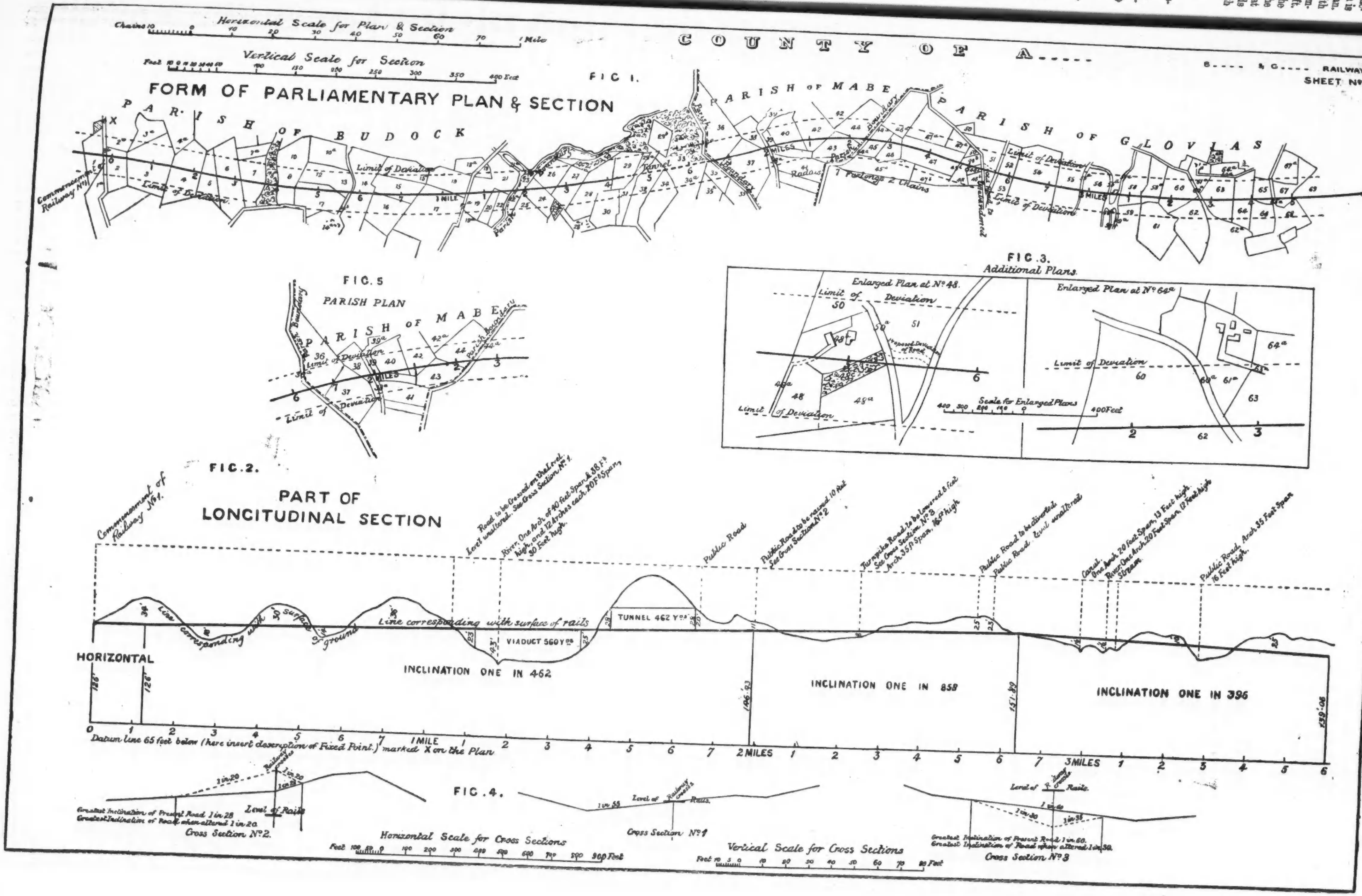

FORM OF PARLIAMENTARY PLAN & SECTION
Horizontal Scale for Plan & Section
Chains 10 0 10 20 30 40 50 60 70 1 Mile
Vertical Scale for Section
Feet 10 0 100 150 200 250 300 350 400 Feet
COUNTY OF A.....
B.... & C.... RAILWAY
SHEET No. 1
PARISH OF BUDOCK
PARISH OF MABE
PARISH OF GLOVIAS
X
Commencement of Railway No. 1
Limit of Deviation
1 MILE
2 MILES
3 MILES
Tunnel
Parish Boundary
Radius 7 Furlongs 2 Chains
Road to be abandoned
PARISH PLAN
Enlarged Plan at No. 48.
Enlarged Plan at No. 64a
Proposed Deviation of Road
Scale for Enlarged Plans
400 300 200 100 0 400 Feet
PART OF LONGITUDINAL SECTION
Commencement of Railway No. 1.
Road to be Crossed on the Level. Level unaltered. See Cross Section No. 1.
River. One Arch of 40 feet Span & 38 Ft high, and 12 Arches each 20 Ft Span 30 Feet high.
Public Road
Public Road to be raised 10 feet See Cross Section No. 2
Turnpike Road to be Lowered 8 feet See Cross Section No. 3 Arch 35 ft Span, 16 ft high
Public Road to be diverted.
Public Road. Level unaltered.
Canal. One Arch 20 feet Span, 13 Feet high.
River. One Arch 20 Feet Span, 12 Feet high.
Stream.
Public Road. Arch 35 Feet Span 16 Feet high.
Line corresponding with surface of ground
Line corresponding with surface of rails
TUNNEL 462 Yds
VIADUCT 560 Yds
HORIZONTAL
INCLINATION ONE IN 462
INCLINATION ONE IN 858
INCLINATION ONE IN 396
126'
146·93
151·89
139·06
0 1 2 3 4 5 6 7 1 MILE 1 2 3 4 5 6 7 2 MILES 1 2 3 4 5 6 7 3 MILES 1 2 3 4 5 6
Datum line 65 feet below (here insert description of Fixed Point.) marked X on the Plan
Railway crosses
Level of Rails
Greatest Inclination of Present Road 1 in 28
Greatest Inclination of Road when altered 1 in 20
Cross Section No. 2.
Cross Section No. 1
Greatest Inclination of Present Road 1 in 60.
Greatest Inclination of Road when altered 1 in 30.
Cross Section No. 3
Horizontal Scale for Cross Sections
Feet 100 50 0 100 200 300 400 500 600 700 800 900 Feet
Vertical Scale for Cross Sections
Feet 10 5 0 10 20 30 40 50 60 70 80 Feet

FIG. 1.

FIG. 2.

FIG. 3. Additional Plans.

FIG. 4.

FIG. 5

16,956, Ventilating and Flushing Water-closets. W. J. Stevens.

A rim runs round the whole of the basin, and terminates at the back in an up-current ventilating-shaft communicating with the outside air. A flushing rim curves inwards and downwards, causing the water to flush out the pan with great force.

17,057, Preventing Escape of Gas. H. W. and A. F. Cole.

A frame is disposed about the burner in such a way that it becomes heated by the flame. The tap or valve is provided with a spring or equivalent means of causing it to close the gas passage when released, and a detent is so placed as to engage with an arm handle of the tap and hold it open. It acts by the difference of temperature actuating mechanism which closes the valve and shuts off the supply.

NEW APPLICATIONS FOR PATENTS.

Nov. 25.—16,234, J. Sheldon, Wall Ties or Bond Iron.—16,233, C. Onions, Flushing Cisterns.

Nov. 26.—16,262, F. Seyde, Metallic Lathing or Backing for Plaster or Cement Partitions and Ceilings.—16,285, A. Johnstone, Mitreing Tools.—16,289, A. Illidge, Opening and Closing Fanlights, Skylights, &c., and Retaining them in any desired Position.—16,300, O. Elphick, Automatic Flushing Tanks.

Nov. 28.—16,322, W. Birdthistle, Draught and Dust Excluder for Doors, Windows, and Skirtings of Rooms.—16,349, A. Spiess, Blocks and Other Mouldings for Building Purposes.

Nov. 29.—16,397, J. Pollock, Lock and Latch Furniture.—16,399, E. Kent, Automatic Ventilating Apparatus.

Nov. 30.—16,456, F. Cook, Preventing Air and Dust passing under Doors.—16,459, D. Knowles, Sash-fasteners.—16,478, W. Snawdon, Floors for Ball-rooms.—16,488, R. Howard and Others, Syphon Cisterns for Flushing Water-closets, &c.

Dec. 1.—16,505, W. Phillips and E. Verity, Sash Windows.—16.506, F. Collins, Sash-fasteners.—16,507, F. Collins, Indicator for Door Fastenings.—16,508, T. Switzer, Water-waste Preventers.—16,512, B. Clark, jun., Automatic Grip Handle and Lock or Latch for Doors, Sashes, &c.—16,529, S. Bond, Apparatus to be used in Making Bricks, Tiles, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

12,654, H. Lomax, Door Fastenings.—13,859, H. Steven and J. Walker, Fastenings for Securing Rain-water and Other Pipes.—13,939, J. Gregory and F. Gilfort, Domestic Fire Escape.—14,287, P. Keogan, Fastening Window Casements, Show Case Doors, &c.—14,507, C. Watts, Balancing Elbow Levers for Opening Greenhouse or Other Lights, Ventilators, or Windows.—14,955, D. Bostel, Syphon Flushing Cisterns.—15,028, J. Lander, Artificial Stone for Flooring, Paving, Decorating, &c.—15,065, F. Ransome, Manufacture of Cement.—15,406, A. Orr, White Lead.—15,520, W. Stanford, Jointing Stoneware and Other Pipes.—3,568, G. Girling, Artificial Stone.—15,203, J. West, Water Waste Flushing Cisterns.—15,342, S. and S. Chatwood, Hydraulic Lifts.—15,531, J. Dyson, Inlet Ventilators.—15,569, R. Lee, Blowpipes.—15,771, F. Crane, Varnishes.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

388, A. Beauvais, jun., Automatic Bolt for Double Doors.—777, N. Leroy, Portable Wooden Houses.—1,294, T. Brown, Raising, Lowering, Balancing, and Holding, in Closed or Open Position, the Sashes of Sliding Windows.—1,338, T. Ward, Hoisting Apparatus.—1,448, J. Bidder, Chimney Cowl or Ventilator.—3,630, T. Jones, Ladders.—4,359, E. Burt, Slide Rule for Cubing Timber, &c.—14,405, J. Cathie, Open Fire-grates.—909, J. Jeffreys, Ventilators.—1,790, J. and E. Podmore, Sash Fasteners.—3,512, A. Kitson, Step Ladders and Trestles.—7,571, J. Tuckett and G. Foster, Mortise Lock.—14,897, P. von Krystoffovitch, Artificial Granite.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

November 28.

By Horne, Son, & Eversfield.

Chelsea—Cremorne Wharf, area about 1 acre, freehold; and 27, Lot's-road, 73 years, ground-rent 9*l*.	£8,500
17, 19, 23, and 25, Lot's-road, 73 years, ground-rent 21*l*.	665

By Weatherall & Green.

Paddington—35 and 37, Walterton-road, 76 years, ground-rent 20*l*.	775
39 and 41, Walterton-road, 76 years, ground-rent 20*l*.	825
Cubitt Town—90, Stebondale-street, 63 years, ground-rent 5*l*.	143
Putney—Ground-rent of 6*l*., reversion in 75 years	220
216, Upper Richmond-road, freehold	640
Tuffnell Park—7, Tabley-road, 79 years, ground-rent 7*l*.	385

By Wells & Read.

Southwark Park-road—Nos. 397 to 403 odd, 10 years, ground-rent 84*l*.	55

November 29.

By E. & F. Swain.

Notting Hill—30 and 32, Ladbrooke-grove, 35 years, rent 20*l*.	1,000
Shepherd's Bush—10, 15, and 17, Providence-place, 22 years, ground-rent 13*l*. 10s.	415
25 and 27, Providence-place, 22 years, ground-rent 8*l*. 8s.	275

By Bean, Burnett, & Co.

Willesden, Tubb's-road—Ground-rents of 41*l*. 13s., term 97 years	£820
Camberwell, Peckham-road — Ground-rents of 8*l*. 15*l*., term 33 years	115
Ground-rents of 8*l*. 15s., term 33 years	115
8 and 10, Denmark-road, freehold	470
Carshalton, Stanley-road—A plot of freehold land	25

November 30.

By Reynolds & Eason.

Hackney—1 to 25, Essex-place, 10 years, ground-rent 52*l*.	620

By P. Matthews.

Streatham-common—The freehold residence, Craigmore	1,150

By Maddox & Son.

Maida Vale—5, Aberdeen-place, 36 years, ground-rent 6*l*. 10s.	530
Edgware-road—117, Princess-street and stabling, 32 years, ground-rent 26*l*. 5s.	310
9, Milner's-mews, 30 years, ground-rent 6*l*. 6s.	170
Euston-square—28, Melton-street, 23 years, ground-rent 16*l*. 16s.	170

By Eastman Bros.

Waterloo-road—No. 68, term 35 years, ground-rent 8*l*. 18s. 8d.	600
Anerley, Croydon-road—Weighton House, 73 years, ground-rent 10*l*.	275

By Alexander Daniel Selfe & Co.

King's Cross — 164, Farringdon-road, 69 years, ground-rent 9*l*.	745

December 1.

By J. G. & A. Prevost.

Stepney-green—1, 2, and 3, Oley-place, 56 years, ground-rent 10*l*. 10s	780
4, 5, and 6, Oley-place, 56 years, ground-rent 10*l*. 10s.	775

By Newbon & Harding.

City-road—12, Alfred-street, 39 years, ground-rent 4*l*. 5s.	420
Islington—22, St. James's-street, 38 years, ground-rent 5*l*.	335
Kingsland—35, Balmes-road, 42 years, ground-rent 4*l*.	370
Islington—4, Arlington-street, 40 years, ground-rent 4*l*. 4s.	425
Hoxton—50, Alma-street, 47 years, ground-rent 5*l*.	430
1, Newton-street, 49 years, ground-rent 6*l*.	290
Clerkenwell—7, 26 to 29, Thomas-street, 22 years, ground-rent 21*l*. 10s.	585
Barnsbury—97 and 99, Bride-street, freehold	820
Camden-road — 100, Brecknock-road, 61 years, ground-rent 6*l*.	770
Haverstock Hill—42, Adelaide-road, 52 years, no ground-rent	780
15, Provost-road, 56 years, no ground-rent	620

By J. Dawson & Son.

Lincoln's Inn-fields—7, 8, 10, and 13, Portsmouth-place, freehold	2,330
Lincoln's Inn-fields, Bear-yard—Freehold block of buildings, area 4,000 ft.	3,290

By Farebrother, Ellis, & Co.

Hendon—The Midland Hotel, freehold	7,700
2 to 9, Hamilton-terrace, freehold	2,820
Cricklewood—The Cricklewood Tavern, freehold	5,625
1 to 16, Cricklewood-terrace, freehold	3,500

December 2.

By Rushworth & Stevens.

South Kensington—29, Queen's Gate-mews, 64 years, ground-rent 5*l*.	1,100
Wandsworth-road—An improved rent of 45*l*., term 22 years	545

By Foster & Cranfield.

Poplar—1, 1a, 2, 3, and 4, Sophia-street; and 1, 2, and 3, Elizabeth-terrace, 79 years, ground-rent 65*l*.	325
Wood-green—13 to 17, Somerville-terrace, 86 years, ground-rent 22*l*. 10s.	365
Stoke Newington—15, Painsthorpe-road, 92 years, ground-rent 5*l*. 5s.	227

By E. Owers.

Fulham — Ground-rents of 47*l*., reversion in 97 years	1,010
West Hampstead — 1, Howard-terrace, 98 years, ground-rent 15*l*.	785

By Toplis & Harding.

Bayswater—10a, Porchester-mews, 51 years, ground-rent 2*l*.	600

MEETINGS.

Monday, December 12.

Society of Arts (Cantor Lectures).—Mr. H. H. Statham on "The Elements of Architectural Design." III. 8 p.m.

Leeds and Yorkshire Architectural Society.—Annual Dinner.

Tuesday, December 13.

Institution of Civil Engineers.—Mr. E. Hopkinson, M.A., on "Electrical Tramways: the Bessbrook and Newry Tramway." 8 p.m.

Manchester Architectural Association.—The Rev. R. H. Snape, of Bolton, on "Scottish Cathedrals." 7·30 p.m.

Wednesday, December 14.

Society of Arts.—Sir Philip Magnus on "Commercial Education." 8 p.m.

Liverpool Engineering Society.—Address by the retiring President, Mr. J. J. Webster.

Friday, December 16.

Architectural Association.—Mr. T. G. Jackson, M.A., on "The Proposal to make Architecture a Close Profession by imposing the Test of Examination and Registration." 7·30 p.m.

Institution of Civil Engineers (Student's Meeting).—Mr. J. H. Parkin on "River-gauging at the Vyrnwy Reservoir." 7·30 p.m.

Edinburgh Architectural Association.—Annual Dinner.

Miscellanea.

Blair Convalescent Hospital, Turton.—Referring to the notice in our last of the Blair Convalescent Hospital, Turton, near Bolton, we are asked to mention that the whole of the ground floors have been laid with Lowe's Patent System of Wood Block Flooring.

Birmingham and Canal Communications.—The *Birmingham Gazette* says that since their appointment the Canal Inquiry Committee of the Town Council have been fully occupied in making inquiries and accumulating a large amount of information. They have devoted their energies to the best method of improving communication with London and other places, as well as to the consideration of the Severn plan or Bristol Channel scheme. It will be remembered that a circular was issued by the committee to the principal traders of the town and district, containing a series of inquiries as to the traffic between Birmingham and various large ports. Many replies were received, and the information thus conveyed has been carefully collated. At the same time the circulars elicited a number of contradictory opinions. A new proposal to connect Birmingham with Hull by way of the Tame Valley and the Trent, a bill to authorise which will shortly be laid before Parliament, will also have to receive the consideration of the committee.

The Metropolitan Board of Works.—The *agenda*-paper for the meeting of the Metropolitan Board of Works to be held this Friday, the 9th inst., contains the following recommendations of the Works and General Purposes Committee:—

> That the resignation of Mr. W. Conquest, of the Engineer's department, be accepted as from Christmas next; and that, from the same date, a retiring allowance of 266*l*. 13s. 4d. a year, being forty-sixtieths of his salary of 400*l*. a year, be granted to him.
>
> That the resignation of Mr. W. Groves, of the Engineer's department, be accepted as from Christmas next; and that, from the same date, a retiring allowance of 195*l*. a year, being thirty-nine sixtieths of his salary of 300*l*. a year, be granted to him.
>
> That for the present no action be taken with respect to the resignation of Mr. J. McDougall, of the Engineer's department; and that the subject be further considered at the end of three months.
>
> That the vacancy in the Architect's department, caused by the retirement of Mr. A. Clemence, be filled by the appointment of an officer in the third class, at a commencing salary of 120*l*. a year, and that it be referred to the Committee to prepare and issue an advertisement inviting applications for the post.
>
> That the Architect do prepare a specification and schedule of prices for works and repairs to buildings that have become the property of the Board in connexion with street improvements and improvements under the Artisans', &c., Dwellings Acts; and that, to enable this to be done, the Architect be authorised to employ temporarily a surveyor at 3*l*. 3s. a week.

The Office of City Architect.—In addition to the candidates for this office whose names we mentioned last week, Mr. Herbert D. Appleton has come forward. The Court of Common Council, at its meeting last week, refused by a large majority to limit the age of candidates to fifty years, as proposed by the Officers' and Clerks' Committee. The proposal to suspend the 83rd standing order of the Court was also negatived by a large majority. In consequence of this, Mr. H. H. Bridgman, who is a member of the Court, will not be a candidate. The election will take place on Thursday next, Dec. 15, and will be by ballot.

Festivity at Exeter.—At Fair Park, Exeter, on Saturday evening last, Mr. Harry Hems entertained to supper his numerous *employés*, to celebrate the twenty-first anniversary of his arrival at Exeter.

The Slate Trade.—Stocks being at present low, and the demand very good, it was decided, at a meeting of the local quarry owners held at Carnarvon last Saturday, to advance prices from the 1st proximo.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ......ton	6	5	0	7	10	0
Teak, E.I. ......load	8	0	0	12	10	0
Sequoia, U.S. ......foot cube	0	2	3	0	3	0
Ash, Canada ......load	3	0	0	4	10	0
Birch ,,	2	0	0	3	10	0
Elm ,,	3	10	0	4	10	0
Fir, Dantsic, &c.	1	10	0	4	0	0
Oak ,,	2	10	0	4	10	0
Canada	3	0	0	6	0	0
Pine, Canada red	2	0	0	3	10	0
,, yellow	2	0	0	4	0	0
Lath, Dantsic ......fathom	3	0	0	5	0	0
St. Petersburg	4	0	0	5	10	0
Wainscot, Riga ......log	0	0	0	0	0	0
,, Odessa, crown	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.100	7	0	0	8	0	0
,, 4th and 3rd	5	10	0	6	10	0
Riga	5	10	0	7	0	0
St. Petersburg, 1st yellow	8	10	0	13	0	0
,, 2nd ,,	7	0	0	8	0	0
,, white	6	10	0	8	10	0
Swedish	6	0	0	14	0	0
White Sea	0	0	0	0	0	0
Canada, Pine, 1st	16	0	0	24	0	0
,, ,, 2nd	10	0	0	15	0	0
,, ,, 3rd, &c.	6	0	0	9	0	0
,, Spruce, 1st	8	0	0	9	0	0
,, ,, 3rd and 2nd	5	0	0	7	0	0
New Brunswick, &c.	5	0	0	6	10	0
Battens, all kinds	4	0	0	10	10	0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Flooring Boards, sq., 1 in., prepared, First	0	8	0	0	11	0
Second	0	6	6	0	7	6
Other qualities	0	4	0	0	6	0
Cedar, Cuba ....foot	0	0	3	0	0	3¼
Honduras, &c.	0	0	2¾	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4½	0	0	7
St. Domingo, cargo average	0	0	4¼	0	0	6
Mexican ,,	0	0	3	0	0	3¾
Tobasco ,,	0	0	3¾	0	0	5
Honduras ,,	0	0	3½	0	0	5
Maple, Bird's-eye	0	0	5	0	0	7
Rose, Rio ....ton	8	0	0	11	0	0
Bahia	7	0	0	9	0	0
Box, Turkey	5	0	0	12	0	0
Satin, St. Domingo ....foot	0	0	5	0	0	9
Porto Rico	0	0	6	0	0	10
Walnut, Italian	0	0	3½	0	0	5

METALS.	£.	s.	d.	£.	s.	d.
Iron—Bar, Welsh, in London...ton	4	15	0	5	0	0
,, ,, in Wales	4	5	0	4	10	0
,, Staffordshire, London	5	10	0	6	0	0
Copper—						
British, cake and ingot ....ton	70	0	0	0	0	0
Best selected	71	0	0	72	0	0
Sheets, strong	75	0	0	0	0	0
Chili, bars	70	0	0	0	0	0
Yellow Metal..........lb.	0	0	0	0	0	0

METALS (*continued*).	£.	s.	d.	£.	s.	d.
Lead—						
Pig, Spanish ....ton	15	5	0	0	0	0
English, common brands	15	5	0	15	10	0
Sheet, English	16	10	0	0	0	0
Spelter—						
Silesian, special ....ton	17	15	0	18	0	0
Ordinary brands	17	10	0	17	15	0
Tin—						
Straits..........ton	166	0	0	0	0	0
Australian	166	0	0	0	0	0
English ingots	0	0	0	0	0	0

OILS.	£.	s.	d.	£.	s.	d.
Linseed ....ton	19	2	6	19	7	0
Cocoanut, Cochin	30	0	0	31	0	0
Ceylon	23	15	6	0	0	0
Palm, Lagos	22	0	0	22	10	0
Rapeseed, English pale	26	10	0	27	0	0
,, brown	25	5	0	0	0	0
Cottonseed, refined	20	10	0	21	0	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	5	0	0	6	0	0
,, refined	5	0	0	12	0	0
Turpentine—						
American, in casks ....cwt.	1	4	9	0	0	0
Tar—						
Stockholm ....barrel	0	15	0	0	0	0
Archangel	0	10	6	0	0	0

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Road-Making and Paving Works	Willesden Local Board	O. Claude Robson	Dec. 13th	ii.
Chimney-Shaft, &c.	Mile End Vestry	J. M. Knight	Dec. 14th	ii.
Paving and other Works	Wandsworth, &c., Un.	T. W. Aldwinckle	Dec. 15th	ix.
Erection of Infirmary	Eastbourne Union	F. G. Cooke	Dec. 16th	ii.
Mountsorrel Pitchers	Gravesend U. S. A.	*Official*	Dec. 17th	ix.
Kerbing and Channelling Works	East Barnet Valley L. B	do.	Dec. 19th	ii.
Cast-Iron Parapet, Tower Bridge	Bridge House Estates Committee	T. Wolfe Barry	do.	ii.
Sewering and Making-up Roads	Brentford Local Board	— Lacey	Dec. 20th	ix.
Brick and Pipe-Sewer, &c.	Leicester Corporation	J. Gordon	Dec. 22nd	ii.
Wood and Stone Paving	Met. Board of Works...	*Official*	Dec. 23rd	ii.
Coachman's Lodge, &c., near Ewhurst	....	J. Kincaid	do.	ii.
Buildings, &c., Mill Dams	Hull Corporation	B. J. E. Bruce	Dec. 29th	ii.
Jubilee Clock Tower, Margate	The Committee	Stoner & Sons	Jan. 3rd	ii.
Cast-Iron Pipe-Sewers, &c.	Surbiton Imp. Com. ...	S. Mather	Not stated...	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Willesden Local Board	3*l*. 3s. per week......	Dec. 14th	xiv.
Drawing Master	Government of Victoria	800*l*.	Dec. 15th	xiv.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays*.]

ALNWICK.—For alterations and additions to the farm buildings, Low Hedgeley, for Mr. J. R. Carr-Ellison, J.P. Mr. Fred. R. Wilson, architect, Alnwick, Northumberland:—

	£	s.	d.
J. Dunn, Alnwick	£2,349	0	0
W. B. Collin, Whickham, Newcastle	1,960	0	0
J. Towers, Alnwick	1,779	0	0
R. Yeaman, Swarland, Alnwick	1,772	0	0
J. Surtees & Son, Bolam, Morpeth...	1,700	0	0
W. Dryden & Son, Glanton, Alnwick	1,614	12	0
W. Steel, Felton, Acklington	1,590	16	0
H. Elliott, Horncliffe, Acklington ...	1,571	0	0
W. Weatheritt, Alnwick	1,566	0	0
T. Kirkup, Glanton, Alnwick	1,555	10	0
Dodds Bros., Powburn, Alnwick	1,550	0	0
W. J. Smith, Alnwick	1,531	4	0
Jeffrey Bros., Glanton, Alnwick	1,520	10	0
J. Muckle, Thropton, Rothbury	1,517	0	0
Green & Douglas, Amble, Acklington*	1,457	12	7

* Accepted.

ALNWICK.—For alterations and additions to cottages, West Hedgeley, for Mr. J. R. Carr-Ellison, J.P. Mr. Fred. R. Wilson, architect:—

	£	s.	d.
W. J. Smith, Alnwick	£455	6	6
W. Steel, Felton, Acklington	434	0	0
Dodds Bros., Powburn, Alnwick	420	0	0
T. Muckle, Thropton, Rothbury	412	3	0
W. Weatheritt, Alnwick	408	7	6
J. Surtees & Son, Bolam, Morpeth	398	0	0
John Towers, Alnwick	397	2	0
Jeffrey Bros., Powburn, Alnwick	386	0	0
T. Kirkup, Glanton, Alnwick*	361	11	0

* Accepted.

ALNWICK.—For alterations and additions to farm buildings, Prendwick, for Mr. J. R. Carr-Ellison, J.P. Mr. Fred. R. Wilson, architect:—

	£	s.	d.
Dodds Bros., Powburn, Alnwick	£236	0	0
Jeffrey Bros., Glanton, Alnwick	213	0	0
J. Suthern, Whittingham, Alnwick ...	203	15	0
W. Dryden & Son, Glanton, Alnwick*	189	3	0

* Accepted.

BALHAM.—For pulling-down and rebuilding the George Hotel, Balham-hill, Balham, for Mr. Thomas Crossley. Mr. G. Treacher, architect, 23, Carter-lane, St. Paul's:—

	£	s.	d.
J. Beale, Westminster Bridge-road (accepted)	£3,460	0	0

[No competition.]

BLOOMSBURY.—For the erection of new premises, in Duke-street and Little Russell-street, Bloomsbury, W.C., for the Dairy Supply Company, Limited. Mr. Robt. P. Whellock, architect, 45, Finsbury Pavement, E.C. Quantities by Messrs. Franklin & Andrews:—

	£	s.	d.
Latney Bros.	£11,590	0	0
Ashby & Horner	11,490	0	0
Holland & Hannen	11,277	0	0
Rider & Sons	11,188	0	0
S. Bush	11,160	0	0
Patman & Fotheringham	10,863	0	0
Colls & Sons	10,760	0	0
Wm. Downs	10,520	0	0
Kirk & Randall	10,438	0	0
J. T. Chappell	10,390	0	0
J. Allen & Sons	9,948	0	0

BUCKHURST HILL.—For the erection of a house, at Palmerston-road, Buckhurst Hill, for Mrs. Thomas. Mr. H. Francis, architect, Palmerston-buildings, Old Broad-street:—

	£	s.	d.
H. Baylis, Highbury (accepted)	£865	0	0

CAMBERWELL.—For the erection of proposed Parish-hall, Camberwell, S.E. Mr. G. Hubbard, architect, 23, Finsbury-circus, E.C. Quantities by Mr. J. Sargeant, Grosvenor-gardens, S.W.:—

	Joinery in Deal. £	Joinery in Sequoia. £	Joinery in Oak. £
Patman & Co.	3,543	3,645	3,873
Baalam Bros.	3,085	3,237	3,350
Holliday & Greenwood	3,077	3,233	3,555
J. T. Chappell	2,904	3,130	3,466
A. & E. Braid*	2,745	3,063	3,113

* Accepted.

CROSSNESS (Kent).—For new surface condensers, &c. at the Crossness Sewage Pumping Station, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer:—

	£	s.	d.
Gwynne & Co.	£6,618	0	0
Hunter & English	6,230	0	0
Rennie & Co.	5,500	0	0
Easton & Anderson	4,815	0	0
R. Moreland & Son	4,730	0	0
Waller & Co.	4,450	0	0
W. & J. Yates	4,224	0	0
Watt & Co.	3,450	0	0

CROYDON.—For making railway and sidings, at Waddon Flour Mills, Croydon, for Messrs. C. Brown & Co., Limited. Messrs. G. Elkington & Son, surveyors, No. 95, Cannon-street, London:—

	£	s.	d.
Pilling & Co., London	£3,853	0	0
Perry & Co., London	3,691	0	0
Magead & Co., London	3,330	0	0
Kerry & Co., London	3,040	0	0
Thos. Rigby, Croydon	2,724	0	0
W. Langridge, Croydon (accepted)...	2,500	0	0

DARTFORD (Kent).—For repairs and improvements to twelve cottages, at Stone. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street:—

	£	s.	d.
Hodges	£425	0	0
R. W. Gilham	350	0	0
Knight	320	0	0
Hewitt (accepted)	289	0	0

HACKNEY.—For laying down new block flooring in the Infants' department of the Wilmot-street School (Hackney T^2); and for diverting the rain-water drains, &c., for the School Board for London. Mr. T. J. Bailey, architect:—

	£	s.	d.
M. C. Duffy & Son	£637	13	0 !
T. Bendon	550	0	0
E. Spencer & Co.	530	0	0
Wood Block Flooring Co.	438	10	0
J. T. Chappell	406	0	0
S. Frankenberg & Co.*	325	0	0 !

* Recommended by the Works Committee for acceptance.

HAMPSTEAD.—For thorough repairs and sanitary improvements to three cottages in Elm-row, Hampstead. for Mr. F. W. Smith. Mr. H. Hardwicke Langston, architect, 9, Great James-street, Bedford-row, London:—

	£	s.	d.	Allow old Materials.
Grey	£248	0	0	£10
Mee	226	0	0	10
Smith (accepted)	210	0	0	—
Ridout	187	15	0	—

HARROW.—For the erection of a house, Bentley Priory, Harrow, Middlesex, for Mr. R. L. Powell. Mr. J. F. Curwen, architect, Kendal, Cumberland. Quantities by Mr. J. Sargeant:—

	£	s.	d.
Staines & Son	£4,341	0	0
Kirby	4,290	0	0
C. Miskin	4,164	0	0
J. Bentley	4,156	0	0
G. & J. Waterman	4,069	0	0
F. Larter	3,986	6	0
Turner & Co.	3,747	0	0
A. & B. Hanson	3,722	0	0
Holliday & Co.	3,698	0	0
J. T. Chappell (accepted)	3,669	0	0
A. & E. Braid	3,665	0	0

For Stables to Bentley Priory.

	£	s.	d.
J. T. Chappell	1,260	0	0

[No competition.]

HEMEL HEMPSTEAD.—For proposed alterations and additions to surgery, for Mrs. Ambler, Hemel Hempstead. Mr. G. Hubbard, architect. Quantities by Mr. J. Sargeant:—

	£	s.	d.
Liberty Wm. Sear	£1,415	0	0
Edward Horn	1,350	0	0
William Sear (accepted)	1,345	0	0

HIGHGATE.—For the enlargement of the "Whittington" School, Highgate-hill (Finsbury BD) by 400 places, for the School Board for London. Mr. T. J. Bailey, architect:—

	£	s.	d.
W. Goodman	£6,714	0	0
H. L. Holloway	6,706	0	0
W. Johnson	6,637	0	0
J. Holloway	6,576	0	0
Stimpson & Co.*	6,474	0	0
Wall Bros.	6,354	0	0

* Recommended by the Works Committee for acceptance

LAMBETH.—For new counter and fittings at the Angel, Lambeth-walk, for Mr. J. Craigen. Messrs. Stock, Page, & Stock, architects, 9, Denman-street, London Bridge:—

	£	s.	d.
J. Beale, Westminster Bridge-road (accepted)	£486	9	0

[No competition.]

LONDON.—For alterations at 56 and 57, Aldermanbury, E.C. Mr. Delissa Joseph, architect, 17 and 18, Basinghall-street, E.C.:—

Portland and Stoke Ground Front.

	£	s.	d.
A. & W. Marchant	£370	0	0
Gilbert Seale	346	7	0
George Herridge (accepted)	325	0	0

Cast, Rolled, and Riveted Ironwork.

	£	s.	d.
C. Williams & Co.	£122	10	0
Measures Bros., & Co.	112	12	0
M. T. Shaw & Co.	108	10	0
Rownson, Drew, & Co. (accepted)	99	0	0

LONDON.—For alterations to the Old Temple Club, Milford-lane, W.C., for offices, &c., for the *People* newspaper, for the Proprietors. Mr. Edward Clark, architect, No. 432, West Strand, W.C. Quantities by the architect:—

	£	s.	d.
Grover & Co.	£4,359	0	0
T. L. Green	4,254	0	0
Holliday & Greenwood	4,193	0	0
C. Pereira	4,179	0	0
C. F. Hewlitt	3,960	0	0
Wilkinson Bros.	3,949	0	0
J. O. Richardson	3,909	0	0
Patman & Fotheringham	3,863	0	0

LONDON.—For erecting scene-painting room, at No. 67, Newington-causeway, S.E., for Mr. James Pain. Mr. Edward Clark, architect, 432, West Strand, W.C. Quantities by the architect:—

	£	s.	d.
Grover & Co.	£359	0	0
Wilkinson Bros.	357	0	0
T. L. Green	349	0	0
J. Oliver	323	0	0

[Architect's estimate, £331.]

LONDON.—For alterations at the Britannia, Kensal-road, W., for Mr. A. C. Duggan. Mr. Edward Clark, architect, 432, West Strand, W.C. Quantities by the architect:—

	£	s.	d.
T. L. Green	£537	0	0
Grover & Co.	520	0	0
Ransom & Co.	496	0	0
J. Anley	456	0	0

LONDON.—For proposed alterations and additions to No. 20, Upper Brook-street, for the Right Hon. the Lord de Ramsey. Mr. J. Sargeant, surveyor, Grosvenor-gardens, S.W.:—

	£	s.	d.
Styles & Son	£1,105	0	0
A. J. Thompson	1,025	0	0
Burningham	1,007	0	0
Army and Navy Auxiliary Co.	958	0	0
J. T. Chappell	775	9	6
A. & E. Braid (accepted)	765	0	0

LONDON.—For the erection of the Carlyle Club, Old-street, E.C. Mr. G. Hubbard, architect. Quantities by Mr. J. Sargeant:—

	Main Building.	Extra to Floors.
Steel Bros.	£5,720	£17
J. Morter	5,677	62
A. Hood	5,654	16
Hearle & Son	5,587	303
Harris & Wardrop	5,373	155
Patman & Co.	5,173	200
Colls & Son	5,130	141
A. & E. Braid	4,950	312
J. T. Chappell	4,890	131

PAIGNTON.—For the erection of an ironmonger's shop and dwelling-house, on the Gerston Estate, Paignton, for Mr. H. Beare. Mr. S. Woodbridge, jun., architect, 210, High-street, Brentford:—

	£	s.	d.
M. Bridgman	£671	2	0
Webber	664	16	0
Rabbich (accepted)	658	10	0

[All of Paignton.]

ROEHAMPTON PARK.—For making-up and kerbing of roads, at Roehampton Park, for the Board of Works for the Wandsworth District. Mr. J. C. Radford, surveyor:—

Alton-road.

	£	s.	d.
Turner	£1,344	0	0
Lucas	1,251	0	0
J. Neal	1,200	0	0
Adams (accepted)	1,193	0	0

[Surveyor's estimate, £1,284.]

Bessborough-road.

	£	s.	d.
Turner	£817	0	0
Lucas	769	0	0
Adams	744	0	0
J. Neal (accepted)	690	0	0

[Surveyor's estimate, £796.]

Hyacinth-road.

	£	s.	d.
Turner	£319	0	0
Lucas	295	0	0
Adams	290	0	0
J. Neal (accepted)	285	0	0

[Surveyor's estimate, £294.]

SOUTHBOROUGH (Kent).—For the enlargement of Christ Church, Southborough. Mr. Theodore K. Green, architect:—

	£	s.	d.
Strange & Sons	£1,938	0	0
Gallard & Sons	1,798	0	0
Jno. Jarvis	1,690	0	0
— Wallis	1,412	0	0
W. H. Canty	1,363	0	0
Punnett & Sons, Tonbridge*	1,287	0	0

* Accepted.

ST. MARY CRAY (Kent).—For extensions and repairs at the Cray Library and Reading-room. Mr. St. Pierre Harris, architect, 1, Basinghall-street:—

	£	s.	d.
W. R. Taylor	£657	0	0
E. A. Bowers	650	0	0
T. Knight	535	0	0
F. Wood	522	0	0
Taylor & Son	436	0	0
Hart Bros.	422	0	0
Somerford & Son*	406	0	0

* Accepted, with additions, at £433.

WALWORTH.—For alterations at the Montpelier Assembly Rooms, Walworth, for Mr. Thos. Butt:—

	£	s.	d.
J. Beale, Westminster Bridge-road (accepted)	£656	0	0

[No competition.]

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